The
Electrical Review

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The Electrical Home

WHEN Sir Alfred Ewing, as President of the British Association, referred to the benefits which have been brought to mankind through the achievements of science, he must have had the service of electricity in the home prominently in his thoughts. Of few, if any, other branches of applied science can it be more truly said that they make "life fuller, wider, healthier, richer in comforts and interest and in such happiness as material things can promote."

There is now practically no function in the home which is not, or cannot be, carried out by electricity. It is, of course, bringing immeasurable relief in the conditions attending life in industry, but in the present issue of the ELECTRICAL REVIEW we have tried to demonstrate that for the home—which should be a place of leisure and of rest—thousands of electrical contrivances are at command for alleviating the drudgery of domestic work and making life happier and healthier for everybody.

The variety and volume of products which form the domestic electrical trade of Britain have reached very large proportions. The expansion in recent years has been remarkable, but as the benefits of electricity become better known, and greater experience is obtained in meeting different tastes and requirements, present records will be left far behind.

As to the potentialities of the market, there are over 4,000,000 users of electricity in Great Britain, of whom some 3,250,000 are domestic consumers. These take about 200 kWh each, instead of 2,000—a figure we may not unreasonably hope to achieve, as it represents only a moderate household consumption for water heating alone. There are still upwards of 4,500,000 unwired houses on the routes of existing mains, and a total of 8,000,000 which could be reached in a few years. Hardly a single householder using electricity lets a year pass without adding some new apparatus. Many, after satisfaction with the first piece, are glad to add half a dozen more. These prospective additions, as well as the unwired houses, constitute an enormous potential demand.

Manufacturers are doing their utmost to meet all conceivable requirements in electrical appliances and services for heating and cooking, lighting and radio service, water heating, refrigeration, health-restoring appliances, electric clocks, vacuum cleaners, laundry, and numerous other labour-saving equipment, as our classified sections show. The whole domestic field is covered, including material and apparatus essential for providing an efficient installation.

The information thus brought together will form a record of lasting assistance to all interested in this rapidly growing branch of the industry.

Come to the Point

THE I.E.E. session opens next Thursday with the presidential address of Dr. E. W. Marchant, who is professor of electrical engineering at Liverpool University. While of course this address will not be discussed in public, papers that follow will, we hope, produce many new speakers. No doubt it will be necessary to limit the remarks of those taking part in some of these discussions to a few minutes each, as in previous years. Many speakers waste so much time complimenting the author that they have to sit down before they have time to finish their valuable constructive criticism. The repeated complimentary references have a sameness about them that makes them appear merely perfunctory. They are best left to the chairman of the meeting, when at the end he asks the audience to express its thanks "in the usual manner."

Efficient Installation

HOWEVER thoroughly makers of electrical apparatus may strive after originality and efficiency, the fact is constantly in evidence that unless the installation be efficiently carried out the best results will not be obtained. A piece of bad work may do untold harm to the electrical cause, and it is our duty to do our utmost to prevent such being installed. The National Register of Installation Contractors aims at raising the standard of work. It frequently refuses membership to those who are unable to prove their technical or financial capacity to undertake responsibilities required by the conditions of registration. On the other hand, there are plenty of contractors who

would not find it difficult to qualify, and the addition of whose strength to the membership would enable the organisation to make a greater rate of progress. Few general domestic consumers know enough about the electrical business to understand what difference there is between a registered and an unregistered contractor. Even some electricity supply authorities, consulting engineers and architects do not know this as well as they should. Yet they are in a position to persuade their customers or clients—the consumers—to induce them to employ registered men. Nobody desires to shut out the well-intentioned small man who naturally claims freedom to enter business, even though he cannot straightaway toe the line precisely. He can do good work and qualify as the ultimate result. The object of registration is not to keep out certain men as men; it is to prevent the carrying out of shoddy work.

Mr. R. P. Sloan's Appeal

DEPRESSED industrial conditions continue to increase the calls made upon the Electrical Trades' Benevolent Institution, and the president, Mr. R. P. Sloan, whose name carries weight with so many in the industry, has issued a special appeal for funds. He says that if the facts relating to the numerous distressing cases coming before the Committee could be made known to those who have work to do and health and strength with which to do it there would be no doubt about the result. We commend his appeal to the sympathetic attention of all. The usual annual Festival Dinner is to give place to a ball with supper and cabaret (November 18th at Grosvenor House), and it is hoped that there will be a record gathering and a magnificent financial outcome so that the funds may suffice to meet an exceptionally heavy demand.

Electrical Illumination

WHATEVER other electrical progress may be made in the home, lighting will always hold first place. It is not an application for this room or that, or a service for a special few of the members of the household or its staff; it affects the life of every person, and has a place everywhere from the entrance hall to the garden, and from the cellar to the attic. There is still a vast volume of modernising work to be done in securing that high standard of efficiency which makes life so much brighter, work so much lighter, and reading so much easier, but great advance is taking place. Old-fashioned fittings may be attractive to the antique mind, but the wide range of modern fittings provides a choice of things both of beauty and utility. British glassware and British brassware combine to gratify all tastes. Electrical illumination, through present-day devices and co-operative planning on the part of the architect and the installer, is pre-eminently adaptable to the general decorative and furnishing scheme of any room. Practical service, restfulness, and beauty combine to give satisfaction, and a satisfied lighting consumer soon wants to introduce the same degree of efficiency into other parts of the household appointments. So let us not neglect the lighting section of the industry.

Three-power Locomotives

THE claims of the three rival methods of electric train propulsion have been dealt with by us from time to time. A report appears in *Electrical Storage* of the operation in the United States of electric tractors that embody the mechanism of a main supply from an outside source supplemented by an oil-electric generator running in parallel with a battery. External power up to 3,000 kW is used to transfer heavy trains to the marshalling yards, where the internal plant comes into operation; the ratio of average power for transfer and marshalling is 450 to 50. The oil-engine set supplies the base load of 200 kW, the peaks up to 800 kW being taken care of by the battery. The latter is used alone where it would be objectionable to run the oil-engine, but its output is not more than 15 per cent. of the internal power generated, so that its losses and maintenance costs should not be unduly heavy. We have often expressed the view that there ought to be a field for the oil-electric engine in any scheme of main-line electrification supplied from external sources. For special work of the character outlined above the battery may prove a useful ally, enabling the oil-engine to work at almost constant load.

Demonstrators

THE demonstrators of electric cooking and other domestic appliances form the spear-head of the attack which is to culminate in the securing of the domestic load for the electrical industry. At the E.A.W. Conference of Women Demonstrators it was suggested that they should be of two classes: those who lecture and make contact with other women's associations, thus preparing the ground, and those who sell appliances and give practical advice in individual cases. We can envisage several sub-grades requiring several types of worker, but in addition to a thorough knowledge of how the apparatus functions and the ability to give clear explanations an essential quality is tact. The demonstrator should give the impression that she can show how electricity can help in the home without any suggestion that she is trying to show the consumer how to run her house. If it is necessary for the supply engineer to put himself in the consumer's place, it is still more necessary for the demonstrator to do so.

Britain Leads

ENGINEERS who have visited America with the "Mechanicals" have told us of the trend there towards the use of large three-phase unit transformers in place of banks of single-phase transformers. In this the United States is following our own practice after an interval of some years. British manufacturers, to meet the conditions of grid interconnection, were able to put forward three-phase units up to 75,000 kVA, with the advantages of a lower capital cost, saving in space, reduction in operating losses, and avoidance of many of the third-harmonic troubles. The feat is all the more remarkable in view of the difficulty of transporting these transformers, as the loading gauge on our railways imposes limitations on their physical dimensions that are not found in other countries.

A Notable Achievement

ENGINEERS possessing the imagination, boldness and technical skill to surmount difficulties of this kind are capable of tackling any electrical problem in any part of the world. But our manufacturers are not content to rest on their laurels; we hear as we go to press that the first of the two 93,750-kVA 12.5/33-kV three-phase transformers built by the Hackbridge Electric Construction Co. will be despatched to Barking "B" power station within the next fortnight. The output is rated in accordance with the British Standard Specification, and is therefore conservative.

A Layman's Assumptions

SOME elementary safety-first rules for the family are given in a lay contemporary. It is stated that more than 100,000 people are injured every year in bathrooms, and that gas geysers are often the cause of accidents. Hints on how to avoid explosions in gas geysers, and also in gas ovens are given, and the precautions to be adopted in handling electrical apparatus and rewiring fuses are simply explained. So far so good. But we are told that an American insurance company has found that nearly 20 per cent. of the claims made during the past ten years have been due to accidents in the home. The writer of the article adds, "In America, probably because of the wider use of electricity, the number of accidental deaths in the home reaches an enormous figure each year." This does not appear to follow from the earlier remarks about gas explosions, and it certainly does not follow from experience. Faulty installation work in the U.S.A., as elsewhere, no doubt increases the number of avoidable accidents, but not to the extent suggested.

Electricity in the Home

Section I—Modern Lighting
„ II—Heating Apparatus
„ III—Cooking Equipment
„ IV—Water Heating
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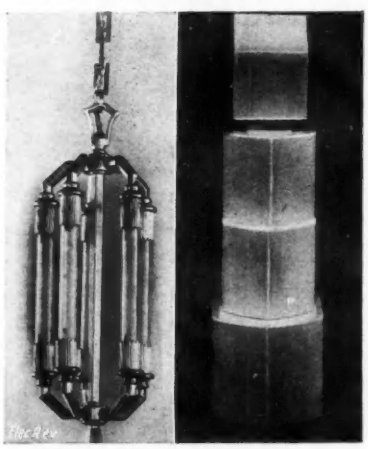
A complete list of the manufacturers referred to in this review, with their addresses, will be found on page 569.

Section I.—Modern Lighting

The combination of utility and art

Electricity provides a method of illumination which is free from the restrictions and limitations of its predecessors and consequently opens a wide field to the artist and designer of which full advantage has not yet been taken. In this section we show, however, that there has been a tremendous advance during the past few years

WITHOUT tradition the endeavour to produce electric lighting fittings might, perhaps, have been made sooner. In any case credit must be given to French designers for having conceived the basic ideas from which much of what is now termed modern lighting has been evolved.



A McGeoch pendant A "Dualite"

The reaction from age-old ideas, however, led to designers deliberately refraining from using anything which bore the slightest resemblance to the past. The result was often the production of much that was crude of form, ugly in proportion, and decidedly out of scale.

Modern lighting does not mean geometric forms of frosted glass, or fantastic arrangements of cylinders, tubes, and cubes. In contour, detail of decorative design, and general assembly of parts, modern fittings must harmonise perfectly with the decorative scheme as a whole, and unobtrusiveness becomes the first consideration.

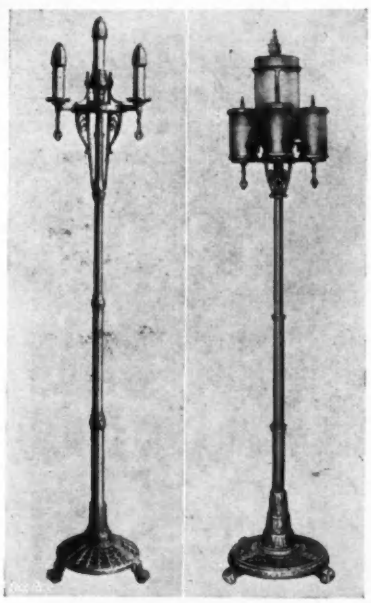
The potentialities of this new approach are enormous. It is a fascinating subject, demanding technical skill, imagination, ingenuity, and an appreciation of art. It would be impossible to describe all the types of fitting now available; therefore, the accompanying illustrations must be left to speak for themselves, in conjunction with notes on any special developments.

An Ormond moulded table lamp

Sunshine Indoors

Another phase of lighting that merits careful attention is the provision indoors of those health-giving rays of the sun which common artificial sources of light do not emit and to which ordinary glass is opaque. The marked tendency, particularly in the United States, to develop lamps which will produce such desirable radiation in addition to visible light is perfectly practical. It is not necessary to expose oneself to such radiation continuously. So-called "sun lamps," auxiliary to normal illuminators, need only be switched on for definite periods each day. This practice has a sound basis, and will unquestionably grow.

A British example of this is the "Vitreosil" lamp of the Thermal Syndicate, Ltd., which is not claimed to imitate the solar spectrum exactly, but the composition of its light approximates sufficiently to that of sunlight to produce a comparable physiological effect. A pure fused silica bowl filters out the harmful rays and allows the beneficial ones free passage. Two complementary light sources are mounted inside the spherical diffusing model, namely, an a.c. quartz mercury-vapour burner and four 100-W metal-filament lamps, the total loading being 1,125W. Attractive hexagonal fittings are available in natural white resembling Japanese paper and in a variety of warm tints. The low coefficient of expansion of the material avoids the risk of cracking small bell globes.



G.E.C. art metal standards

Striplight and Linear Fittings

There is a bewildering variety of this type of fitting available. Of late certain styles have become noteworthy because of the wide appeal they are likely to make in the modern home. Designed to satisfy the present vogue for originality, they are made expressly for accommodating lamps of the "Striplight" double-ended pattern—not the candle type.

A Holophane prismatic bowl

Such fittings embody chromium-plated metal work of choice simplicity and etched glassware of semi-cylindrical patterns tinted with amber, pink, and green, as well as white, relieved with neat sand-blasted engraved lines. They are made for all regular positions and are obtainable as pendants, wall brackets, ceiling fittings, standards, table models, mantelpieces, for recesses, etc., and also in continuous runs for halls, door surrounds, and other situations where continuous lengths of visible illumination are required. There is an entire absence of glare, dazzle, or uncomfortable brightness, for the etched and relieved glass-

Siemens kitchen ceiling fitting

ware diffuses the light most effectively.

Colour plays a big part in modern decoration, and full use is being made of it in fashioning fittings which combine efficient illumination with decorative art in the home. The "P.I.X." fittings of Hume, Atkins & Co., Ltd., go a stage farther by catering for those who demand

"Quakerlite" table standards

linear designs. These fittings can be made to suit individual tastes of white opal glass tubing in straight lengths, bends, circles, festoons, &c., which operate direct at standard low voltages. Linear lighting units are loaded to 34 W per foot, giving one candle-power per watt. The guaranteed life of the tubes is 1,000 hours and replacement is simple.

Glassware Fittings

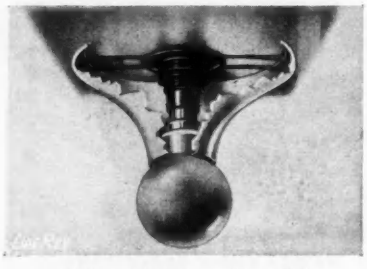
Cut crystal glassware of British manu-

An illuminated K.F.M. name plate

facture is now obtainable in excellent variety, and plain opal spheres suspended from a slender metal tube are returning to fashion. Totally indirect lighting is also coming into vogue again, by means of opaque floor standards which project all the light upwards so that it is reflected down from the ceiling without shadows or glare.

"Internalite" name and number plates are an effective means of house identification at night. The K.F.M. sign is priced at 38s. 6d., and is made of plate glass on which the characters are engraved, the illumination being obtained through the edge of the glass from a lamp concealed at the top, which at the same time provides some light in the porch.

For the nursery, hall, and landings where a night-light is needed "Cryselco" and Philips 5s. opal "Twinlite" and "Duo-savelite" lamps are ideal. The small bulb contains two filaments and the cap contains a cord switch, so that by merely pulling the cord a dim (4-W) or bright (25-W) light is obtain-

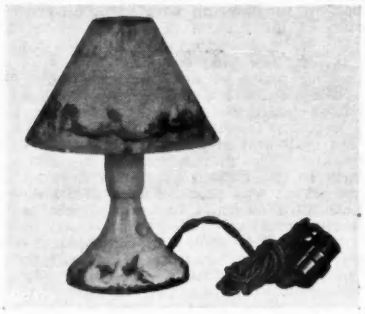


A Philips kitchen ceiling fitting

"Mek-Elek" book rest

able at will. Colour-sprayed candle and tubular lamps, including a white spray which imparts a glossy opalised surface, have many applications.

McLeod mirror reflectors, sold at from 1s. 6d. to 5s., are much more effective



A Vessco moulded table lamp

than lampshades for concentrating a beam of light locally on to a writing desk or similar position. White opal "Langham" and conical shades are other specialities.

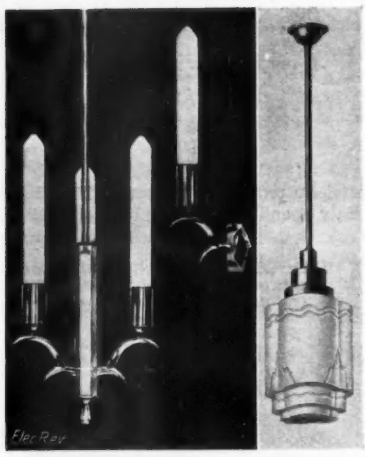
The "Mek-Elek" book-holder is an ingenious device for securely holding and at the same time lighting a book or magazine, from the smallest up to about 12 in. high and of any width. No special brackets are required; the weight is only

A "Vitreosil" sunlight bowl

2¼ lb., and even with a heavy book it causes no discomfort when laid on the bedclothes. It can easily be moved with one hand, and is equally suitable for use in an armchair or at a table, as well as for reading in bed. The standard model, at 25s. 6d., can be had in oak veneer or five attractive colours. The back is readily adjustable by a simple thumbscrew and the whole can be folded flat for packing. There is also a portable battery model.

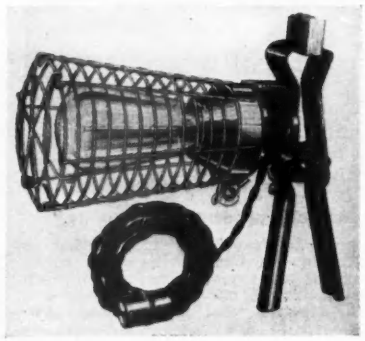
Portable inspection lamps have proved their utility in many homes. Of the types available, the 10s. "Gripper" of the British Central Electrical Co., Ltd., is made to clip on anywhere and so leave the user's hands free. It is shock-proof, the lamp is enclosed in a wire guard, and the flexible connecting lead is so attached as to relieve it of strain.

All-steel alkaline batteries are used in "Ionic" hand-lamps. One of several patterns, the unspillable battery itself forms the lower portion, so that an outer container is dispensed with. The head-piece is quickly detachable, and contains a 3-in. parabolic reflector, 8-c.p. lamp, and a thumb press switch in the hollow handle. Its price is 57s. 6d.



(Left) A Drake & Gorham pendant and wall bracket. (Right) An Ediswan Harcourt pendant

Amongst battery torches and pocket flash-lamps the Edison "Hike-lite" projects a beam 300 ft. A compass is fixed



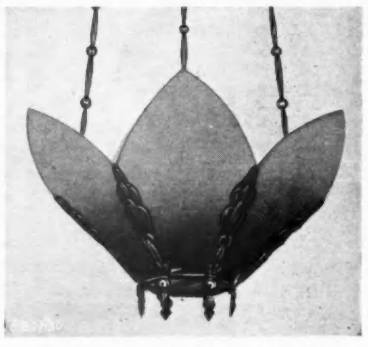
The "Gripper" hand lamp

at the top, protected by a hinged cover which contains a mirror. The hinge pin carries a metal loop for fastening the torch to one's belt or inside a car. There is a three-way switch and focusing is adjusted by turning the torch head; its price is 10s.

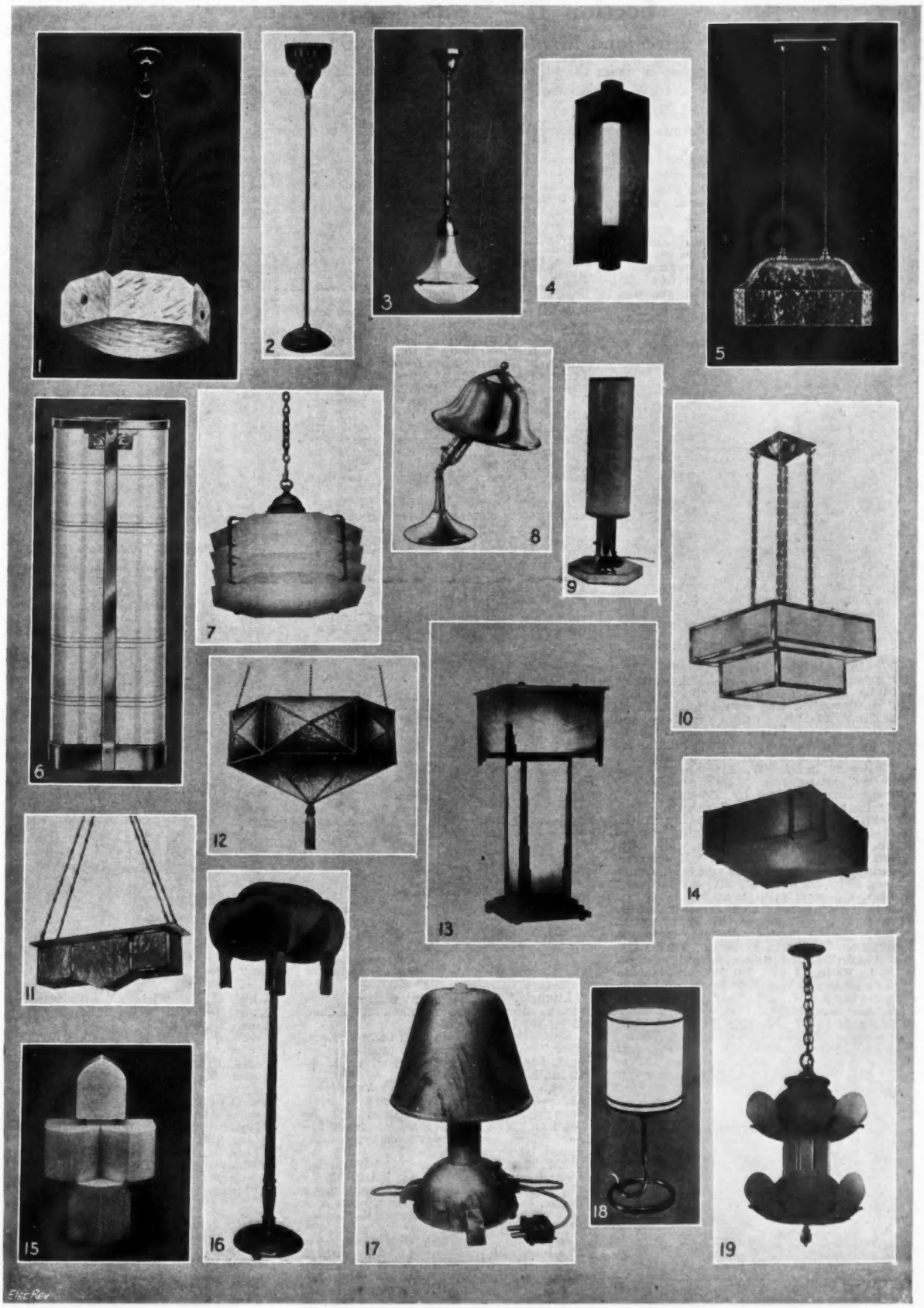
Fancy battery night-lights of many varieties as well as miniature coloured lamps and "Pifco" novelties for decorative purposes are obtainable from the Provincial Incandescent Fittings Co., Ltd.

The attractive range of "Valbania" fittings includes tubular, geometrical, and pressed "shell" glassware.

Plain and fancy "Typerlite" standards and brackets are adjustable in every direction.



A panelled pendant (Wholesale Fittings Co.)



A Few Representative Modern Lighting Fittings

1. A "Vitreosil" pendant, combining light and ultra-violet rays (Thermal Syndicate). 2. A "Monolamp" indirect-lighting standard. 3. A Siemens-Schuckert pendant. 4. The "Lucerne" wall bracket (20th Century Electrical). 5. A gilt fitting (L. G. Hawkins & Co.). 6. A G.E.C. tubular table standard. 7. A pendant by Dernier & Hamlyn. 8. A Hawkins adjustable table lamp. 9. The "Porcelet" tubular dressing-table lamp (Chas. Selz). 10. A Drake & Gorham panel pendant. 11. A Drake and Gorham dressing-table pendant. 12. A rippled parchment "bowl" fitting (Siemens Elec. Lamps & Supplies, Ltd.). 13. A table lamp by the 20th Century Electrical. 14. A Dernier and Hamlyn ceiling fitting. 15. A "Dualite" built-up Gothic fitting. 16. A floor standard by Electric Art Shades. 17. A Becker moulded table lamp. 18. A tubular steel table lamp (Best & Lloyd). 19. A Falk, Stadelmann pendant

Section II.—Heating Apparatus

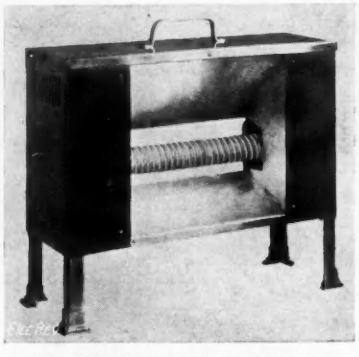
Fires and low-temperature heating equipment

Including all radiant heat appliances under the heading of "fires," we estimate that there are about 6,000 models on the market, with loadings of from 500 W to 4 kW at prices from a few shillings up to £40 or more. Limitations of space preclude more than a bare mention of about 1,000 of the fires available. Only one reference is given to each of several loadings and finishes for each type of fire, and models which closely resemble others mentioned of the same make have been omitted

To facilitate reference the fires are grouped in broad classes and subdivided according to makers with the loading and price given in each case:—

Imitation Coal Fires

Berry's Electric, Ltd. (Magicoal):—"Inset," 3 kW, for slow-combustion openings, 29 by 22 in., 8 guineas; "Kent," 3 kW, modelled after design by William Kent, bright, rustless, 26 by 30 by 19 in., £36; "Georgian," 3 kW, for large set-back fireplaces, 17 by 28 in., bright, rustless, £15; "Queen Anne Pedestal," 3 kW, 17th century, 34 by



The "Tu-Ways"; Bratt, Colbran

29 in., bright, rustless, £24 10s.; "Adam-Shell," 3 kW, late 18th century, 26 by 30 in., £19 15s., bright, rustless; "Sundown," 3 kW, semi-set-back, 16 by 20 in., £4 10s., bright rustless and satin brass; "Fireberry," 3 kW, overhead heating, bronze, 21 by 22 in., £9; "Sungleam," bar fire, bright, rustless, 16½ by 26 in., 3 kW, £9; "Louis Newberry," extending side legs, antique and bright, rustless, 26 by 23½ in., 2 kW, £9 12s.; "Wonderberry," ashpan effect, oxidised silver or copper, 16 by 21 in., 61s., 2 kW; "Magiclog," blazing glow of wood, for openings 20 to 48 in. wide, without heat £10, side dogs £7; "Newberry," canopy reflector, antique and bright, rustless, 20 by 23½ in., 3 kW, £8; "Fireblaze," back reflector, satin brass, 15 by 20 in., 3 kW, 6 guineas; "Sunberry," front fire bars, oxidised copper, 12 by 17 in., 1 kW, 45s.; "Jacobean," back reflector, antique, bright, 16 by 30 in., 3 kW, £14; "Tudor," back reflector, bright, rustless, 25 by 28 in., 3 kW, £21 15s.; "Fleur-de-lis basket and dogs," 36 by 28 in., bright, antique, 3 kW, £19 10s.; "Adam," extended legs, bright, rustless, with brass, 28 by 33 in., 3 kW, £36; "Chinese Chippendale," bright, rustless, 26 by 30 in., 3 kW, £33; "Haddon Hall," bright, rustless with brass dogs, antique, 36 by 28 in., 3 kW, £26; "Jacobean circular brazier," antique, bright, 16 by 16 in. (feet

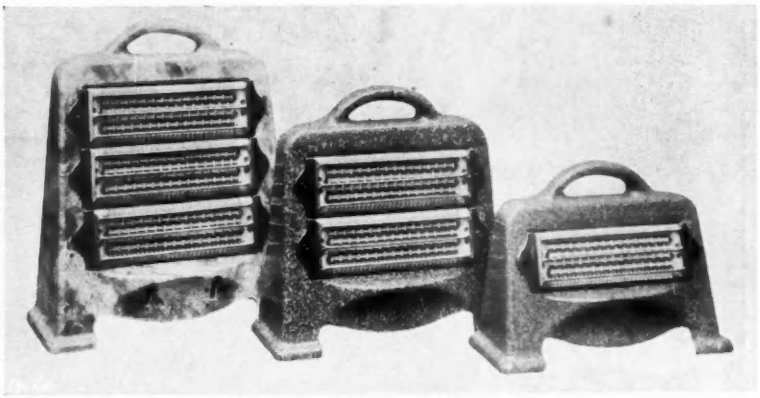
The Creda "Log"

span), 2 kW, £25 15s.; "Warwick," overhead reflector, bright, rustless, 26⅜ by 33⅜ in., 3 kW, £30; "Oxford," panel top, bronze, 29 by 36 in., 3 kW, £35; "York Adam," built-in, bright, rustless, 36 by 39¾ in., 3 kW, £58; "Oval Adam brazier," antique, bright, 26 by 16 in., 3 kW, £35; "Louis Lattice," bright rustless with brass, 18 by 28 in., 3 kW, £17 15s.; "Tudor Rose," brazier type with reflector, antique, bright, 23 by 26 in., 3 kW, £32; "Plain basket and Georgian brass dogs," 34 by 30 in., 3 kW, £38; "Log Basket, and Smoke Canopy," 24 by 14 in., 3 kW, £27 10s., with dogs; "Arrow Grate," bright, rustless, 33 by 26 in., 3 kW, £35.

British Electric Transformer Co., Ltd. (Tricity):—No. 762, "Glowincoal," top chromium reflector, silver, 25 by 19½ in., 2½ kW, £7 15s.; No. 784, top reflector, antique brass, 2½ kW, 21½ by 17⅜ in., £5 4s. 6d.; No. 860, hearth coal and curb effect, direct reflection under square top, copper shaded, 1½ kW, 62s. 6d., 19¾ by 15¼ in.; No. 865, "Glowincoal," bar elements, below fuel, sprayed oxidised copper, 2 kW, 55s.

"Tricity Norwich," upright horizontal non-reflector elements above the coal, 20½ by 18 in., each of the two elements is loaded at 2 kW; "Wells," reflector fire, 57s. 6d., 2 kW, 19 by 14⅜ in.

H. W. Sullivan, Ltd.:—"Lumina," fuel at open top, front elements below, antique brass, 22⅜ by 12 in., £2 19s. 6d., 2 kW; "Brazier" fire, fuel at top, front elements, top reflector inclined, antique brass, 20¾ by 13½ in., £1 19s. 6d., 1 kW;



A range of "Edac" fires

"Luxuria," inclined front with elements at top, canopy reflector, black and nickel, 25 by 18½ in., 5 guineas.

Berkeley & Young, Ltd.:—"Mirraglow," inclined front elements below coal, back reflector, frosted silver, 18 by 16 in., 2 kW, £2 7s. 6d.

John Shaw & Sons (Wolverhampton), Ltd.:—Crescent, No. 46, bar fire, back canopy reflector, art bronze, 10⅜ by 24¼ in., 3 kW, £6 10s.; No. 58, front fire bar below coals under canopy, hinged guard trivit, art bronze, 19¼ by 15¼ in., 2 kW, 3 guineas; No. 65, 1-bar model, front heating, top fuel, art black, 16⅜ by 15½ in., £1 16s. 6d.; No. 66, step-shape frame, inclined front element, open coal at top, back reflector, art black, 18½ by 17½ in., 4 guineas.

Hattersley Bros., Ltd. (Swinton):—No. 47, inclined coal below back vertical elements, oxidised copper, 14 by 21 in., 2 kW. £3; No. 49, for recess of tiled surround, elements above coal, 21½ by 24 in., oxidised silver, 2 kW, £4 15s.; No. 32, welled fuel under hammered reflector, elements at back, 16 by 21 in., 2 kW, £4.

Arora Co.:—Coal bar fire projects in front of elements above, 21½ by 17 in., black, 2 kW., £4 19s. 6d.

Carron Company:—"Collingwood," vertical elements under front of horizontal coal in square frame, art silver, 15 by 22 in., 2 kW, £2 15s.; "Blake," coal at foot of sweeping canopy, polished aluminium prismatic reflector, 16 by 19½ in., art silver, 2 kW, £3 15s.; "Howe," elements inclined above back of fuel, "chromalt" fabric, 15½ by 21 in., 2 kW, 5 guineas; "Adam," dog grate construction, canopy reflector, polished rustless with enrichments, 28½ by 32 in., 3 kW, £26; "Fleur-de-lis," for antique mantelpieces, antique

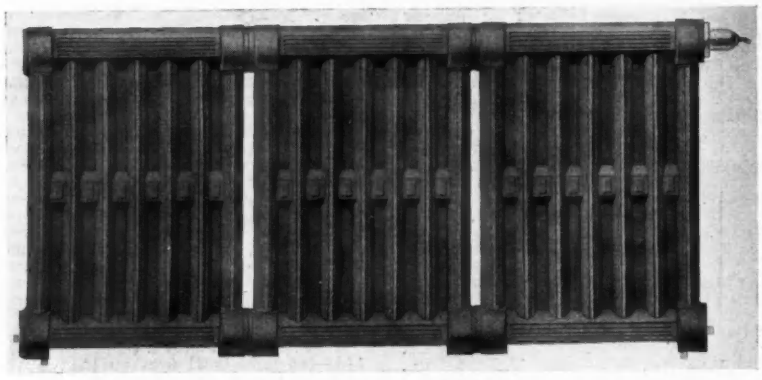
Ferranti "Grandera"

armour, 42 by 27 in., 3 kW., £20; "Georgian," dog grate with canopy, rustless, with hand-pierced fret, 32¼ by 30½ in., 3 kW, £40; "Nelson," dog grate with direct reflection from canopy, rod element, chromium plated, 27½ by 26½ in., 2½ kW, £11 3s.; "Drake," basket fire with canopy reflector, antique armour, 21 by 28 in., 2 kW, £10.

Premier Electric Heaters, Ltd.:—"Fairlight," inclined coal below elements at foot of canopy reflector, antique copper, 21½ by 18 in., 2½ kW, £5 12s.; "Manor," fuel at open top, antique copper, 23 by 22 in., 3 kW, £10.

Edison Swan Electric Co., Ltd.:—"Tudor," flat-back reflector above coal in dog fire, chromium, 2 kW, £5 2s. 6d.; "Vera," canopy above coal in bar fire, oxidised brass, 2 kW, £3; "Savoy," element and reflector under coal in dog fire, oxy. brass, 2 kW, £3.

The Shaw "Governor Junior"

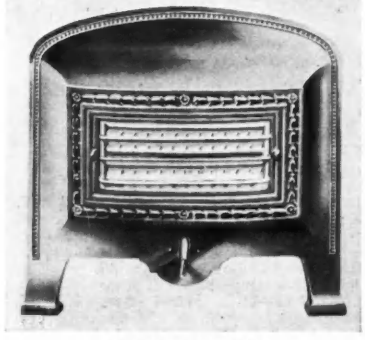


Genii hot-water panel heater

Belling & Co.:—"Flicker," inclined elements below horizontal fuel under framed reflector, antique silver, 15½ by 19 in., £3, 2 kW; "Cheery," bar fire with back reflector under elements, antique brass, copper, 20½ by 16 in., 2 kW, £3 5s.; "Venetian," front-projected fire below inclined elements, antique brass, copper, 22½ by 17 in., 2 kW, £3 10s.; "Log," projected fire below frame elements, antique brass, 17½ by 20½ in., 2 kW, £3 15s.; "Princess," front elements below coal under canopy, oxidised brass, 18 by 22½ in., 2 kW, £4 15s.; "Lounge Log," logs under elements, oxidised silver, 26 by 21½ in., 3 kW, £9; "Medieval," heavy basket fire projecting under elements, armour bright, 19½ by 26¾ in., 2 kW, £7.

H. G. Moseley & Co., Ltd. ("Eddo"):—"Eddoglo," back elements above fuel, antique copper, 2 kW, 60s.; "Cosy Coal," front elements below fuel, 1 kW, antique silver, 44s.

Falkirk Iron Co., Ltd. ("Trilite"):—No. 354, log dog fire for large recesses, rough armour bright, with black Sussex back, 54 by 25 in., £23; No. 360, fuel under inclined elements, sprayed silver, 18 by



A Hotpoint model

22 in., 2 kW, 5 guineas; No. 347, log hearth fire, with dogs, 44 in. wide, £9 12s. 6d., 2-kW heater, £4 12s. 6d.; No. 346, log fire in basket with dogs, 34 in. wide, £14 5s., 2-kW heater, £4 12s. 6d.; No. 318L basket fire under canopied elements, rough armour bright, 2 kW, 20 by 18 in., £7 10s.; No. 338, dog grate below direct reflection element, art black, 20 by 18 in., 2 kW, £7 10s.; No. 362, inclined fuel under elements, metal sprayed silver, 16 by 22 in., 2 kW, £3 10s.; No. 357, direct reflection elements above fuel, 17 by 24 in., black, 3 kW, £7; No. 5214, dog grate, 20 by 13 in., £10; No. 4940, "Tudor," dog grate surmounted at back by direct reflection element, 20 by 18 in., 2 kW, rough armour, 10 guineas; open fuel fire, with three direct reflection elements above, 19½ by 24 in., £6 15s., 2 kW.

Siemens Electric Lamps & Supplies, Ltd.:—H7311, front elements below coal under reflector, 2 kW, 23½ by 15½ in., matt bronze, £4; H7240, open fire below canopied element, 22 by 19 in., armour bright, £4 15s., 2 kW; H7220, to fit in grate recesses, 2 kW, 17 by 23 in., armour bright, £4 10s.; H7280, "slow combustion fire," 3 kW, 13 by 19½ in., oxidised silver, £11 10s.; H7230, bar fire with top and bottom reflectors, 3 kW, 26½ by 20 in., armour bright, £8; H7110, front elements below fuel and reflector, 2½ kW, 26 by 16 in., armour bright, £6; "Phœnix," front elements below canopied fuel, 2 kW, 24 by 15 in., oxidised copper, £3 15s.

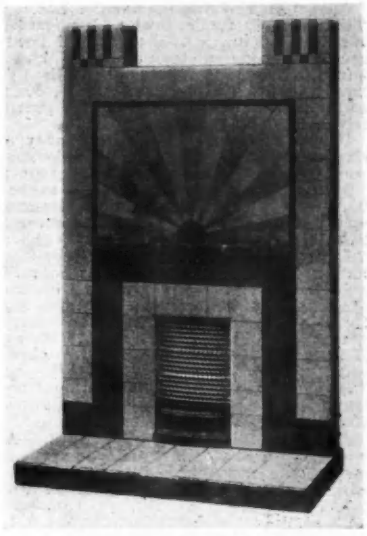
Credenda Conduits Co., Ltd. (Creda):—"Juno," inclined front element below fuel, aluminium silver, 14 by 18 in., 35s., 1 kW; "Nestor," coal welled under elements, sprayed bronze, 1,500 W, 50s., 24 by 18½ in.; "Trivet Coal," inclined elements below coal front, aluminium silver, 21½ by 19½ in., 2¼ kW, 63s.; "Eros," coal partly recessed under element, aluminium silver, 22½ by 21 in., 2¼ kW, £4 14s. 6d.; "Log," fuel under elements, polished aluminium, 24 by 18½ in., 2½ kW, 6 guineas; "Warwick," welled fuel, canopy reflectored element, antique bright, 29 by 21½ in., 3 kW, 10 guineas; "Sandringham," cradle shape fire, canopied element above, antique bright, 28 by 22 in., 3 kW, 12 guineas; "Stratford," welled fire and canopied element in square frame, antique bright, 30¾ by 21¾ in., 3 kW, 15 guineas.

Electric Fires, Ltd. ("Heatrae"):—"Ardent," fuel at base of fireclay back in which element is recessed, oxidised copper, 18 by 16 in., 2 kW, £3 10s.; "Roslyn," front heat under coal, canopy reflector, oxidised copper, 23 by 20½ in., 2 kW, £4 15s.; "Royal," front elements under coal, short back reflector, widespread legs, antique brass, 30 by 26 in., 2 kW, 8 guineas; "Canopic," central fuel behind lattice front, vertical elements on either side at front, stainless steel, 33 by 25 in., 3 kW, 10 guineas; "Brazier," 40 by 30 in. bottom diameter, armour bright, 30 guineas; "Night Moth," front fuel at foot of reflector, antique copper, with aluminium reflector, 20 by 17½ in., 2 kW, 3 guineas; "Butterfly," recessed coal under front elements, oxidised copper, 18½ by 13½ in., 2 kW, 55s.; "Electriglow," basket fire, aluminium, 22 by 19 in., 2 kW, 5 gns.

Electric Domestic Appliance Co. ("Edac"):—"Idian," cast sides with c.p. sheet-metal back, electro bronze, two-bar, 2 kW, 70s.; "New Zealand," 2-kW reflector coal, front inclined elements, 55s.

Bratt, Colbran & Co.:—A heaped coal fire, complete with ebonised mahogany architrave, &c., £38 4s. 6d.; No. 99, dog grate with element welled at base of reflector at back, bronze, £11 10s.; No. 544 F, dog grate with 3-rod elements in separate troughs in front, 2½ by 18 by 10½ in., 3 kW, £15; No. 1,376, dog grate with logs, 24 by 15 by 18 in., 3 kW, £18 10s.

Falk, Stadelmann & Co., Ltd.:—"Lounge," spiral element under the fuel, 1½ kW, 17 by 16 in., 51s.; "Conqueror," two elements under the coal, 1½ kW, 12¾ by 21 in., 52s.; "Gem," element at the back of the fuel, heat reflected forward, three bars in front of the coal, 1 kW, 16 by 14½ in., 52s. 6d.; "Maisonette," upright horizontal elements with the coal in a grate below and in front, 13¾ by 15½, 3 guineas; "Leader," 1½-kW element at the front, sloping back slightly with the coal on top and behind it, hob over the element, 13¾ by 18 in., 3 guineas; "Urban," reflector coal fire with the element hidden at the back of the coals; "Mansion," 3 kW, reflector coal fire with the element behind the coal, 18 by 21 in., £5 10s.; "Duchess," with dogs, 10 guineas, 3 kW, 31½ by 24½ in.; "Fleur-de-Lis," designed to conform with 17th century decorations, provided with dogs, 3 kW,



A complete "Bell" fireplace

28½ by 26½ in., 14 guineas; "Old Tudor," 3 kW, £22.

Reflector Fires

Dowsing Radiant Heat Co., Ltd.:—No. 1,032, screen radiant bowl, 29½ by 19¼ in., satin brass, 660 W, £4; No. 1,025, bowl in inclined frame, enamelled, 40s., 660 W; "Pedestal," No. 947, 12-in. bowl fire, 660 W, 15s.; No. 945, 660-W bowl fire with black base, 27s. 6d.

Carborundum Co., Ltd.:—"Globar"

Siemens-Schuckert convector equipment

A Falkirk "Trilite"

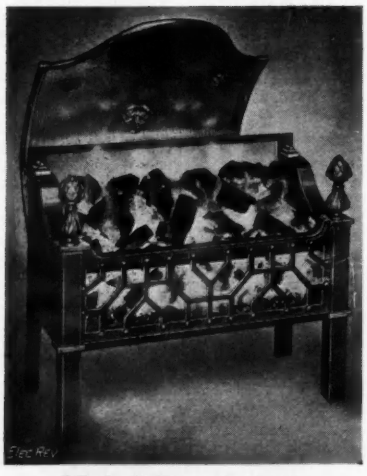
The " Primo " air diffuser

double-rod element fire with horizontal trough reflectors, swivelled on frame for floor mounting or wall fixing, suitable for cooking, 13½ by 8½ in., 1,000 W, £3.

Cooper-Stewart Engineering Co., Ltd.:—"Sunbeam," focal heater for multi uses, 7 by 9 in., 32s. 6d.; pedestal bowl fire on lacquered trunnion and base, 9 in. diameter, 500 W, 11s. 6d.; "Giant" bowl fire, 30½ in. diameter, 850 W, 30s.; a fire with "corrugated" reflector guard trivet, 1,000 W, 30s.

Ferranti, Ltd.:—Fires with bar-type elements focused in parabolic reflectors so as to flood lower levels of room; "Modera," without end pieces to reflector, 1¼ kW, 17⅞ by 16½ in., vitreous enamel, £2 2s.; "Era," with end pieces, 2½ kW, 26⅜ by 22½ in., black, £4 10s.; "Luxera," no reflector ends, 17⅞ by 20½, natural bronze, 7 guineas; "Grandera," no reflector ends, with dogs, real bronze enrichments, chromium, 16 guineas, 20½ by 14½ in.; "Flush," chromium-plated surround, 2½ kW, 25 11/32 by 22 3/16 in., 10 guineas; "Panel," chromium surround, 2½ kW, 26 11/32 by 7 3/16 in., £6 10s.; wall fires without reflector ends and with swivelled reflector, 750 W, 7 11/32 in., £2 10s.

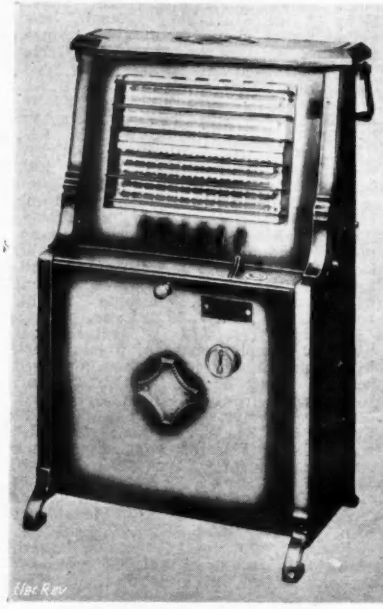
Jackson Electric Stove Co., Ltd.:—A variety with 1-, 2-, and 3-rod type vertical elements, each focused in its own trough. Chinese fabric and other finishes, No. 700, 750 W, 1 guinea, 15½ by 5 in., can also be used for light cooking; No. 702, 17¼ by 11⅞ in., 3 bars, £2 17s. 6d.; No. 704, 2 bars, in surround, 20 by 15 in., £2 12s.; No. 712, 4 bars, 25½ by 19 in., with panel-type surround, £4 19s.; No. 741, elements in projection from surround, 26 by 17 in., 3 bars, £4 10s.;



"Tudor" (Berrys Electric)

No. 720, horizontal element surmounted by guard trivet and back aluminium reflector, black with stainless steel, hob 23½ by 16 in., £3 7s.; No. 713, 2-bar vertical model in ornamental surround, 19¼ by 13 in., oxidised copper, £2 16s.; No. 709, plain sheet metal, 2-bar vertical, 21⅞ by 13½ in., oxidised silver, £3.

British Electric Transformer Co., Ltd. ("Tricity"):—No. 760, concealed element focused in large reflector, 13½ by 13¼ in., silver nickel with chromium, 32s. 6d.; No. 600, non-luminous element with steel reflector for skirting fixing, 6 by 19 in., £1 3s., 500 W. "Tricity" "Sunrays" employing lamp-type heaters for emulating sun warmth, all shielded on the Venetian-blind principle: "Pagoda," vertical single-lamp pedestal model, 55½ by 12 in., polished copper, £3 13s. 6d.; "Mimosa," two-lamp model with 1,000-W wire element, 19⅞ by 14½ in., £5 5s.; No. 871, horizontal model with bar-type element at bottom, 1¼ kW, 22 by 16½ in., £3 5s.; No. 872, two No. 871 models in one frame, £4 17s. 6d.; "Minitoso" five-lamp model for 28 by 15 in. opening, 7 guineas No. 738, same as "Minitosa," but with four lamps and 1,200-W element, £8 17s.; "Santoy," three-lamp vertical circular model, 20 by 16 in. dia., £4 17s. 6d.; "Geisha," horizontal model, five lamps and 600-W element, 30½ by 20½ in., £12 12s.; "Flood-o'-San," 30 by 20½ in., five lamps and 1,600-W elements, £14 2s.; lamp standard model with four lamps 70 in. high, No. 632 shade 22 in. dia., 14 in. deep; "Suwa" four-lamp model



The " Magnet " slot-meter fire

with two-side radiation, 25 in. by 15½ in., £6 7s. 6d.; "Katori" four-lamp model with "gilled" element, 1 kW, £5 17s. 6d.

There are four new "Tricity" fires—the "Hereford," 2 kW, 42s. 6d., octagonal shape and fluted legs, chromium-plated reflector behind the element, 23 by 24½ in.; the "Chelmsford," chromium-plated reflector, 19 by 18½ in., 2 kW, price 39s. 6d.; the "York," 21s., 12½ by 17⅞ in.; the "Lincoln," 2 kW, 39s. 6d., 21 by 24½ in.

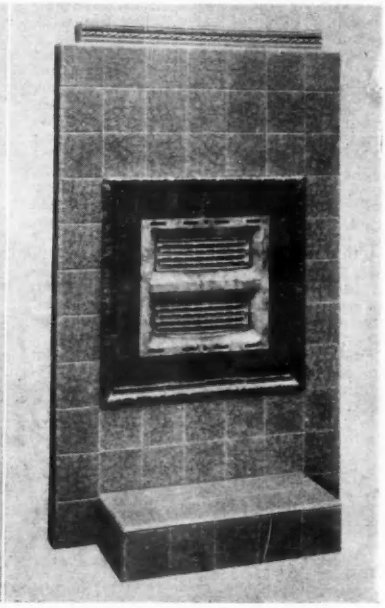
Forward Electric Co., Ltd.:—"Shaftesbury," bowl fire in polished copper bowl and black and gold base.

Hotpoint Electric Appliance Co., Ltd.:—"Signet," 600-W bowl fire, 13½ in. dia. by 16 in., stoved black, £1 5s.; "Signet," 600-W fires, 17 by 19 in., porcelain, £1 15s.; "Hedlite," 600-W bowl fire, 11 in. dia., 14s. 6d.; "Sprite," 600-W bowl fire in hammered surround, 16½ by 16 in., stoved black, £1 5s.; No. 901, screen fire, 2 kW, 27½ by 24 in., oxidised copper, £3 19s. 6d.; "Radiant," welled element at base of hammered reflector, 2 kW, 18 by 20 in., oxidised copper, £3 2s.

Bulpitt & Sons, Ltd. ("Swan"):—750-W pedestal bowl fire, 11in. dia., copper with colour guard and element mount, 10s. 6d.; 1-kW adjustable bar fire, horizontal rod element in trough, vitreous enamel, 15s. 6d.; 2kW bar fire, with two rod elements in separate troughs, one vertical front and one inclined top, vitreous enamel, 25s.

Fraser & Howard, Ltd.:—"Elite," screen fire, vertical element, 1 kW, 40s.

Inventum Appliances:—(R. A. Wood) two-bar sheet-metal fire, with separate brass trough reflectors, 1,000, or 1,400 W, black muffled, £1 7s.; one-bar fire, crystallised brass reflector, 500 W, 18s. 6d.; two-bar wall fire, 700 W per bar, black enamel, chromium reflector, £2 7s.; three-bar fire, with curved front, brown with brass reflectors, £2 15s.; two-bar



A built-in Froy fire

model, with chromium-plated reflectors recessed in rectangular frame on rod supports, figured bronze, £4 15s. Simple two-bar model, sheet metal throughout, 40s. Bathroom fire, 3ft. by 7in., adjustable reflector, 1,700 W; one-bar shockproof wall fire, 14 by 7in., 500 W, £1 16s.; all the above models have horizontal elements, and the following are of the vertical type: four elements, oxy-silver, chromium reflector, £8; dome-shape front; six-bar models, with dome front on surround, oxy-silver, c.p. reflector, £19; two-bar fire, with recessed inclined elements, 17¼ by 12¼in., figured bronze, £3.

Rowland's Electrical Accessories, Ltd.—Screen fire, with 10-in. copper bowl, oxy-copper, 30s.; 10-in. bowl fire, 600 W, on cast stand, 9s. 6d.

Siemens - Schuckert (Gt. Britain), Ltd.—265 mm. bowl fires on tripod and pedestal stands, burnished iron and insulating material stands, 500 W.

H. G. Moseley & Co., Ltd. ("Eddo"):—Radiant, 2¼-kW, 3-rod vertical fire, with separate reflectors, antique brass, 2¼ kW, 50s.; "Super Trivet," front upright and top inclined heating, back reflector, oxy-copper, 3 kW, 64s.; 2 trivets; "Leigh," 550-W pedestal bowl fire, 10s. 6d.

Electric Domestic Appliance Co. ("Edac"):—11-in. bowl fire, 600 W, chromium-plated bowl, 17s. 6d., cast-iron fluted base; a model with a tall back, hammered reflector, surmounting flat and inclined top elements; also 15s. model (600 W); "Indian," 2 kW, c.p. reflector, £3 10s.; "Shaftesbury," 8 in. bowl, 10s.; "Ceylon," 1 kW, 17s. 6d., c.p. reflector.

An " Electrowan " heater

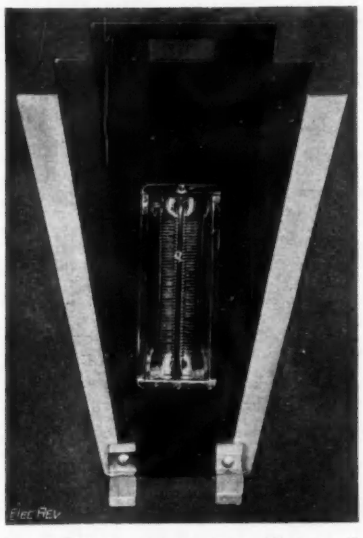
Electric Fires, Ltd. ("Heatrae"):—"Saloon," 6-bar vertical model, separate reflectors, curved front, 3 kW, 17¼ by 25in., stainless steel and chromium, 10 guineas; "Corona," 3 welled elements at foot of recessed reflector in

vertical frame with feet, 23½ by 21 in., 2 kW, satin back with bronze, £3 15s.; "Sunglo," 1 kW, 17 in., pedestal bowl fire, 32s. 6d.; "Tropic," screen bowl fire, 12-in. bowl, 660 W, 25s.; "Hotspur," bowl fire, on tripod legs, 15s.

Arora Co.:—Welled element at foot of hammered reflector, old gold, 20½ by 15 in., 2 bars, £2 7s. 6d.; "Welcome," 9 trough reflectors form semi-circular back to central vertical element, 500 W, 10½ by 13 in., 19s. 6d.; "Bungalow," curved reflector at foot of horizontal element, 12 by 12in., 750 W, matt black, £1 4s.; "Halo," bowl fire, 19s. 6d.

Hotpoint Electric Appliance Co., Ltd.:—11-in. pedestal bowl fire, 600 W, 14s. 6d.

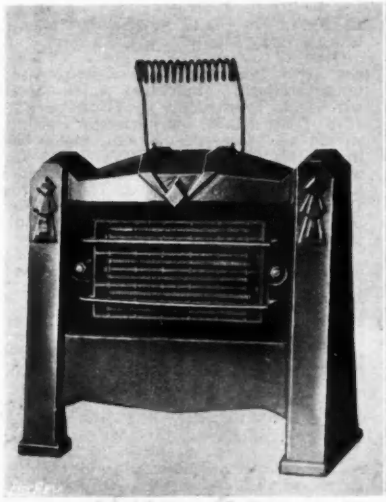
Artic Fuse & Electrical Manufacturing Co., Ltd.:—"Artic Flame" combined radiant and convection fire, 1¼ kW, 21½ by 12 in., art copper, 55s.



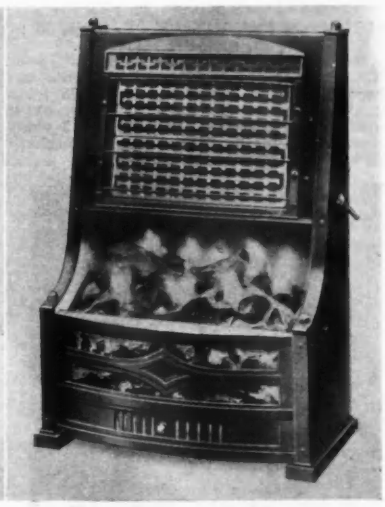
An "Elite" screen fire (Fraser & Howard)

Credenda Conduits Co., Ltd.:—"Bolus," 10½-in. bowl fire, 600 W, 12s.; "Varsity," front and top heating under reflector surmounted by trivet, 21 by 14 in., aluminium silver, 35s.; "Suez," 4 rod vertical elements with separate troughs, dome front, 3 kW, 23 by 14½ in., bronze, 92s. 6d.; "Sunstar," 1 single rod, horizontal trough, 750 W, 9½ by 11 in., sprayed bronze, 8s. 6d.; "Sunstar," 3 rod vertical elements with separate reflectors, angular front, 17⅞ by 12⅞ in., 2¼ kW, sprayed bronze, 57s.; "Sahara," flat front, 3 bars, vertical model, 3 troughs, 2¼ kW, 18 by 14 in., bronze, 62s. 6d.; "Equator," 6 bar vertical elements, heating all sides, 4½ kW, 3 to 6 switches, 21⅞ by 14⅞ in., 6 guineas.

Siemens Electric Lamps & Supplies, Ltd.:—"Batt," horizontal rod element in



Cast model by Rowlands



A Carron coal fire

trough reflector on stand, 750 W, 10 by 14½ in., 18s. 6d.; "Fulray," 12½-in. pedestal bowl fire, 600 W. 24s. 6d.; bowl type

Trough reflector fire (Bulpitt's)

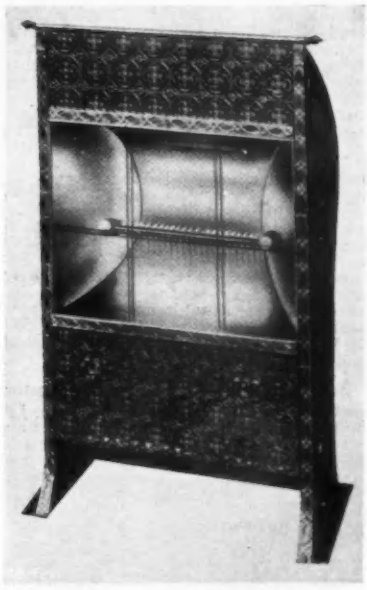
screen fire, 600 W, 27 by 20 in., antique brass, £4; "Victor," welled elements at base of hammered reflector, 2 kW, 20½ by 18 in., bronze, £2; "Berkeley," 2 vertical rod elements in common reflector, 3 kW, 24 by 18 in., oxidised silver, £3; "Howard," deeply recessed welled element under arched reflector, 2 kW, 18½ by 16½ in., black and copper, £2 17s. 6d.

Falkirk Iron Co., Ltd.:—"Reflex," horizontal trough-reflector fire, porcelain enamelled, aluminium reflector, 1 kW, 11½ by 6¼ in., 15s. 6d.

Edison Swan Electric Co., Ltd.:—600-W pedestal fire, in polished copper, 13s. 6d.; 750 W, 14-in. hammered reflector, 22s.; "Raymond," horizontal element at base of arched reflector, oxidised brass, £2 14s.

The "Radiant" series of fires with the elements directing heat back on to reflector, 1 kW, 15½ in. by 16 in., £1 15s. "Radiant Adam," fitted with dogs, oxidised silver, £6 19s. 6d. (3 kW). Screen fires, flat, 2 kW, 23⅜ in. by 27½ in., oxy-copper, £3 7s.; bow front elements, 750 W bars, with 1 bar, 14s. 6d.

Berkeley, Young, Ltd.:—"Coronet," horizontal curved element at base



The "Artic Flame"

of hammered reflector, 2 kW, £2 4s.; 12-in. bowl fire, brown enamelled, 12s. 6d.

Premier Electric Heaters, Ltd.:—"Denbigh," semi-recessed and welled element at base of arched reflector, 24½ by 15 in., 3 kW, antique copper, £5 15s.; "Derwent," heavy ornamental construction, welled element under tall hammered reflector, antique copper, 3 kW, £5 15s.; "Selwyn," sector-shaped element under curved-back reflector, 3 kW, antique copper, £4 2s. 6d., 21 by 15 in.; "Berkeley," welled element under curved-back reflector, 1½ kW, antique copper, 19½ by 6½ in., £4 10s.; "Swing," cradled element with curved-back reflector, antique copper, 22½ by 22½ in., £6 10s. "Atom," central curved element projecting from recessed reflector, copper bronze, 15½ in. over handle by 11½ in., 1 kW, 35s.; "Countess," welled element under arched reflector, oxidised silver, 19½ by 14½ in., 1½ kW, £3; "Regent," 12½-in. bowl fire, 600 W, figured copper reflector, copper base, 25s.

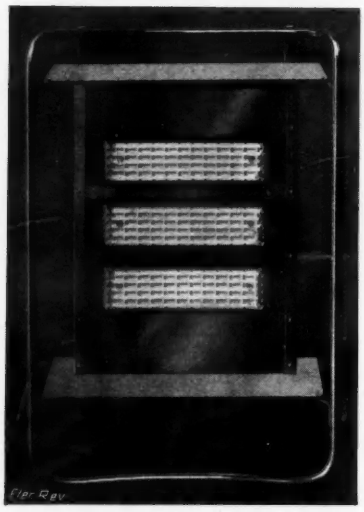
Carron Company:—"Gloucester," inclined elements cradled under curved reflector, oxidised copper, 14 by 8½ in., £3 12s. 6d.; "Clyde," 3-rod element, vertical fires with separate troughs, eggshell

Berkeley & Young's "Coronet"

A Hattersley coal fire

black enamelled, 11½ by 5½ in., £2 5s. 6d.; "Bowl," 10¼ in. dia., 600 W, 14s. 6d.

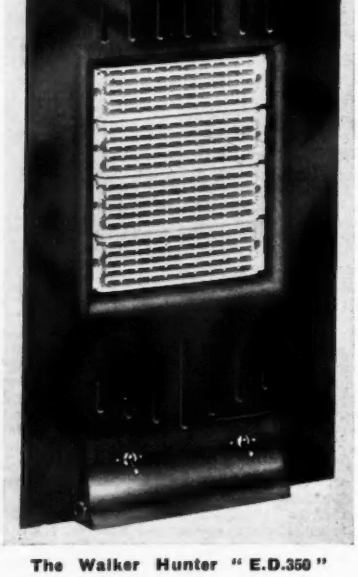
Hattersley Bros., Ltd. ("Swinton"):—No. 36, welded and recessed elements at base of curved reflectors, 17 by 25 in., 2 kW, hammered copper reflector, oxidised copper, £3 14s. 3d.; No. 44, 3 vertical rod elements with separate troughs, 22 by 14 in., 3 kW, £3 18s. 6d.



A very modern style (Best & Lloyd)

John Shaw & Sons (Wolverhampton), Ltd. ("Governor"):—"Wenlock," welled elements under curved reflector, oxidised copper, 19¼ by 16¾ in., 2 kW, £1 19s. 6d.; "New Trojan" bowl fire, 10½ in., polished copper, 13s. 9d., 750 W; No. 07X, 2-rod element vertical fire with separate troughs, 1½ kW, art bronze, 19 by 13 in., £2 11s.; No. 020, 3 horizontal rod elements with separate troughs, art bronze, 25 by 15½ in., £4 7s.; No. 32, horizontal rod element in trough, 750 W, 10¾ by 14¼ in., art black, £1 8s.; No. 014, single rod horizontal trough fire, swivelled for kettle use, 11 by 16½ in., 750 W, art black, 25s.; No. 35, rod element, trough, inclined front, 750 W, 10 by 13½ in., art black, £1 2s.; No. 44, designed for grate opening, inclined element recessed under hammered reflector, art bronze, 24¼ by 16½ in., 2 kW, £3 13s.; No. 45, elements focused in curved back and bottom reflector, 2 kW, 22½ by 20 in., art bronze, 3 guineas; No. 60, cradled element, hammered reflector back, art bronze, 22 by 19¼ in., 2 kW, £3 3s.; No. 28, inclined and top elements under curved-back reflector, guard trivet, 28¾ by 12¾ in., art black, £2 4s.

Belling & Co.:—"Reflector," sector element below curved hammered reflector, oxy-copper, 22 by 18 in., 2 kW,



The Walker Hunter "E.D.350"

£2 10s.; "Radiant," inclined element, bronze, 23 by 17½ in., 2 kW, £2 18s.

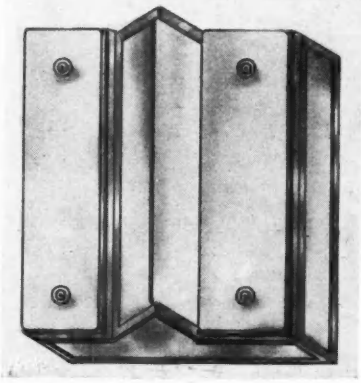
General Electric Co., Ltd. ("Magnet"), No. D2520, welled element recessed under reflector, extended side panels with legs, bronze, 20½ by 24 in., 2 kW, £9 5s.; No. D2538, for permanent fixing, welled and recessed element, 24½ by 20½ in., 2 kW, £6 15s.; No. D2536, front and welled elements, back reflector, matt black, 3 kW, 24 by 19 in., £5 17s. 6d.; No. D2522, cradled elements, back reflector, 15½ by 14½ in., real bronze, £1 17s. 6d.; 600-W 9-in. bowl fire (D2749), 17s. 6d.

H. W. Sullivan, Ltd.:—"Minerva," welled element, back reflector, nickel, 17½ by 12 in., 1 kW; £1 10s.; "Charma," front heat, back reflector, black enamel, 20¾ by 14½ in., 1 kW, £3 10s.; "Comforta," welled element recessed in three-sided reflector, black enamel, 2 kW, 20½ by 14¾ in., £3 15s. 6d.; "Beacon," 600-W, 13-in. bowl fire, antique copper, £1 1s.

Walker, Hunter & Co., Ltd.:—No. ED401, cradelled inclined element, stoved black, 14½ by 11¼ in., 1,000 W, 35s.

Bratt, Colbran & Co.:—No. 26T, recessed vertical rod element, with slabbed surround, 25½ by 27½ in., £6 5s.; "Inways," rod element placed centrally between two double-sided reflectors, 18 by 15½ by 6½ in., 2 kW, rustless steel, £6 6s.

Revo Electric Co., Ltd.:—"Sultan," figured sides of cast iron support hammered copper reflector, 9¾ by 13½ in., 1 kW, 14s. 6d.; "Nouvean" 600-W bowl fire in rectangular frame, decorative, 11 in. diameter, 14 by 14 in., 18s. (antique copper); "Sunbeam" bowl fire, adjustable, 600 W, 12-in. diameter, 10s. 6d.; the "Cosy," horizontal element under a deep reflector, 22 by 14 in., 1,200 W, 43s.;



Combined heating and lighting unit (Berkeley & Young)

"Duplex," cast-iron frame and hammered copper reflector with sides, horizontal 2-kW element, 24 by 15 in., £3 (black and copper); "Matchless Minor," 1,500 W, horizontal element under reflector, guard over element, 46s. 6d.

Falk, Stadelmann & Co., Ltd. ("Efesca"):—"Competitor," 600-W bowl fire, 10s. 6d.; "Efesca," combined bowl fire, griller and boiler, fitted with two swivels on either side for vertical or horizontal use, 12¾ in., 650 W, 25s.; "Dutch Oven," horizontal elements covered by a wired guard below a copper reflector, 11 by 14½ in., 750 W, 25s.; "Regal," curved elements, 2 kW, 11½ by 22 in., 54s.

Candy & Co.:—"Devon," combined coal and electric fire, three 1-kW elements in their own reflector troughs.

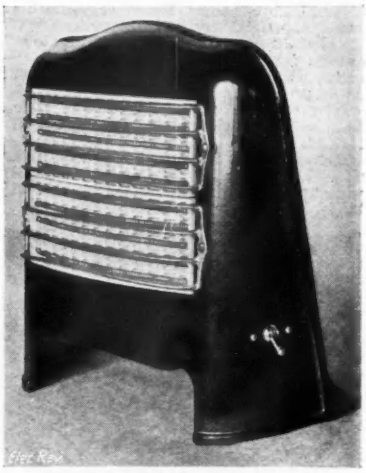
Homefyre, Ltd.:—The "Merrifire" heater, 10½ in. by 8 in., curved reflector, 550 W, 6s. 11d.; bowl fires, 500 W, 5s. 11d. and 9s. 11d.; screen reflector fire-bowl fire fitted into a screen, 500 W, 9s. 11d.

Sturge & Baker, Ltd.:—The "Household," curved elements, polished copper reflector, 16 in. by 12 in., 1 kW model, £2 6s.; "Vesper" screen fires, rectangular screens with circular or rectangular fires incorporated, from £1 15s. to £2 9s.; "Vesper 106," ornamental design, square screen, £3 (1 kW); "Rose" reflector fires, 300-1,000 W, 12s. 6d. to £1 14s.; "Maltese Cross" rectangular, 1,500 W, 20 in. by 14 in., £1 15s.; "Red Cross," original design, reflectors at the side of and above element, 35s. to 68s.

Non-reflector fires

Best & Lloyd, Ltd.:—No. 30677, 2 kW, 24½ by 16 in., front elements below rippled-glass screen, stippled iron and polished aluminium, £6 8s.

Electric Fires, Ltd. ("*Heatrae*"):—"Norvic," front heating with bottom protection, satin black, 2 kW, 19 by 15 in., £2 19s. 8d.; "Home-fire," light construction on legs, 13 by 17 in., 1 kW, satin black, £1 5s.; "Forbar," picture-frame construction, 2.6 kW, art oxy-copper, 16½ by 14 in., 50s.; "Nursery" over a mantelwall fire, one bar, oxy-copper, 19s. 6d., 9 by 14 in.; "Baby Grand," light con-



The "English Electric" design

struction, curved front, 2 kW, 18 by 13 in., 38s.

Jackson Electric Stove Co.:—No. 752, plain cast fire, 13½ by 13½ in., vitreous enamelled, 3 kW, 37s. 6d.; No. 753, for use with modern architecture, vitreous enamelled, 10½ by 14¾ in., 1 kW, 21s.

Electrical Domestic Appliance Co.:—"Newfoundland," cast fire, all black, 26s., 2 kW; "Tasmanian," sheet metal, antique brass, 3 kW, 37s. 6d.; "Standard" cast iron frame, 1 kW, 13s.; "Canadian," 2 kW, 27s. 6d., slanting elements.

H. G. Moseley & Co., Ltd.:—"Reliance," sheet metal, inclined front, 2 kW, antique copper, 39s. 6d.; "Service," sheet metal, broad side bottoms, 1½ kW, oxy-copper, 1½ kW, 19s. 6d.; "Diamond," panelled element bars, 2 kW, oxy-copper, 40s.; "Shell," cast, 1 kW, 16s. 6d.

Rowland's Electrical Accessories:—Cast frame, grey enamel, 1 kW, 14s. 9d.

Hotpoint Electric Appliance Co., Ltd.:—"Utility," projecting curved front, below elements, grid top, white enamel and c.p., 16½ by 13 in., 2 kW, £2 19s.; "Gem," picture-frame construction, 17½ by 16 in., 2 kW, old gold, 38s.; "Sunbeam," scrolls on frame, 21½ by 14½ in., 3 kW, porcelain, £3 2s. 6d.; "Jewel," plain frame, 16½ by 13 in., stove black, 2 kW, £2 7s. 6d.; "Tryst," bars set back in ornamental frame, 20½ by 15½ in., 3 kW, porcelain, £3 15s.; "Cosy," sheet metal, bottom trivet, 19½ by 15 in., 3 kW, brass, £4 2s. 6d.; "Regent," sheet metal, top trivet, 21½ by 14 in., 3 kW, copper, £5; "Mantel," inclined front bars slightly set back, 22 by 14½ in., 3 kW, porcelain, £4 15s.; "Radiac," vertically curved front, with legs, 21½ by 17 in., stoved black, 3 kW, £3 10s.; "Brilliant," bottom trivet, 16½ by 13 in., c.p., 2 kW, £4.

British Electric Transformer Co., Ltd.:—"Tricity," No. 782, cast frame, vents at top, 15¾ by 14½ in., vitreous enamel, 2 kW,

"Efesca" fuel appliance

35s.; No. 866, semi-reflector, front projecting sides with legs, 11 by 14 in., oxy-gold, 17s. 6d.; 1 kW, No. 723, projecting front at base, vitreous enamel, 14¾ by 13½ in., 2 kW, 42s.; No. 677, separated bars in front, vertically curved, 17 by 12½ in., 2.4 kW, antique brass, 105s.; No. 675, horizontally curved front, tall legs, 7 bars (vertical), 30 by 23 in., 4.2 kW, n.p., 9 guineas; No. 577, 5 vertical bars, side projecting legs and front, 3 kW, 21½ by 28½, in., armour bright, £8 7s. 6d.

Dowsing Radiant Heat Co.:—"Hot Bar," sheet metal, 2 kW, 27s. 6d.

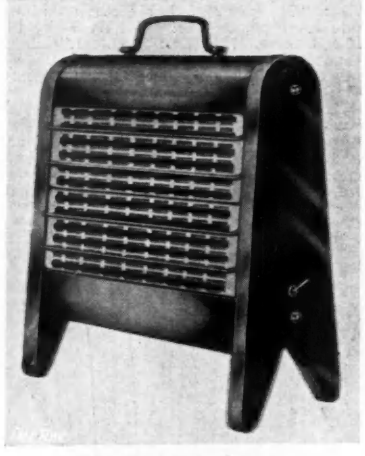
Archibald Low & Sons:—"Highlow," inclined front, 1.5 kW, black. 35s.

English Electric Co., Ltd.:—Plain curved frame, inclined front, vitreous enamelled, 2 kW, 24s. 6d.

Electroway Heaters, Ltd.:—Plain construction with angle legs, 15 by 12½ in., 2 kW, 32s., bottle blue.

Berry's Electric, Ltd.:—"Magicoal," "Berryl," curved frame with extending base, front, oxy-copper, 1 kW, 10½ by 13 in., 17s. 6d.; "Winta," sheet-metal construction, 3 kW, 21 by 12 in., 49s. 6d.

Arora Co.:—"Haven," cast front, tall legs, 2 kW, 16 by 14 in., bronze, 30s.; Manor, 5-bar screen fire, 3 legs, sides



The Revo "Selmore"

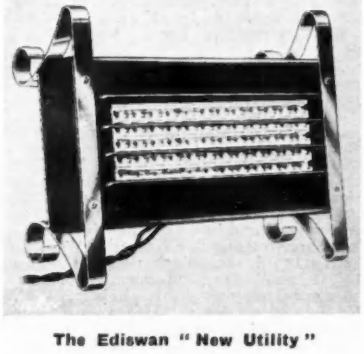
curved to front, 2½ kW, oxy-silver, £3 5s.

Bell Fireplace Co.:—Complete fireplace with faïence and tiled surround.

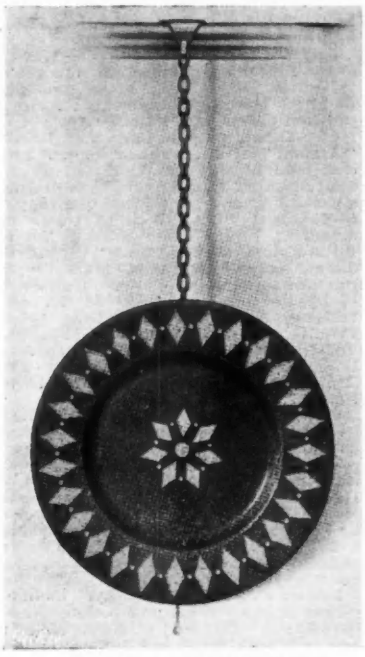
Domestic Electrification, Ltd. ("Dolphin"):—"Ashley," plain curved frame, squat, 1 kW, art black, 25s.; "Townsend," c.p. frame and fender top with surround and Chippendale legs, 3 kW, 27 by 19½ in., art black, £5 15s.; "Tudor Rose," screen fire, 24⅜ by 15½in., 2 kW, black and gold, £3 6s.; "Abbey," cast curved frame with bottom trivet, 19⅛ by 13⅛ in., 2 kW, black and copper, 47s. 6d.; "Chippendale," screen fire, taller on one side, 25½ by 16½ in., 2 kW, £3 7s. 6d.

Girlings, Ltd.:—Mosaic, J.S.B., sheet metal with inclined front and recessed elements, 500 W, 5s.; stove construction; U.A.2, front and top heat, typewriter shape, 2 kW, 20s.; C.V., cast frame, vitreous enamelled, 2 kW, 30s.

Walker, Hunter & Co., Ltd.:—No. 340. stove-type fire, sheet metal, inclined front, perforated top, toasting attachment, 1,000 to 3,000 W, 13⅜ by 13½ in., black enamel, £1 14s.; No. 380, plain cast curved frame, 15½ by 12 in., 1,000 W, stoved black, £1; No. ED300 clock-shape frame, 1 kW, 16 by 12 in., porce-



The Ediswan "New Utility"



"Maxheat" plaque heater

lain, £2 7s. 6d. No. ED328, rectangular frame with barred front, 16 by 13 in., 1½ kW, stoved black, £1 10s.; ED350, for tiled surrounds, front plate 24 by 15 in., 2 kW, stoved black, £2 15s. 6d.

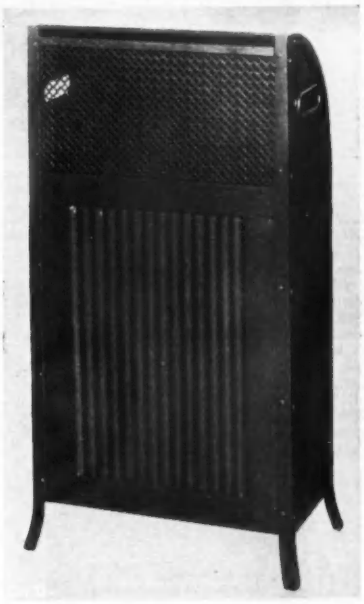
H. W. Sullivan:—"Popular," sheet-metal construction with top vents, 2 kW, 17 by 12 in., antique brass, £1 19s.; "Maxima," clock-shape frame, 18½ by 16½ in., 2 kW, antique silver, £2 2s.; "Roma," sheet-metal with scrolled legs, 19 by 10⅜ in., 2½ kW, black and copper, £3 6s.; "Challenga," sheet metal, inclined front, 22½ by 14½ in., 3 kW, antique brass, £3 15s.; "Siesta," deeply recessed elements in frame with side, top, and bottom reflectors, 1½ kW, 19½ by 12 in., antique silver, £3 10s. 6d.; "Attracta," light construction, front projection at foot, inclined elements, 2 kW, 20½ by 12⅜ in., black enamel, £2 10s.; "Summit," S curved front, 3 kW, 24 by 18½ in.,

A "Chromalox" heater

black and brass, £7 1s. 6d.; "Four Way," all-round heating, 3 kW, 26 by 20 in. square, antique brass, £6 19s.; "Bolda," cast frame, plain curved top, 3 kW, 25 by 20⅜ in., bright ebonite, 3 guineas; "Scroll," inclined heating, 2 kW, 16 by 12½ in., black enamel, £2 10s.; "Invicta," elements in front projected panel, 3 kW, 26 by 18½ in., black enamel, £6 16s. 6d.; "Perfecta," inclined bottom and upright top bars in light metal frame, 1½ kW, 14 by 13½ in., black enamel, £2 2s. 6d.; "Adapta," sheet metal, 12⅜ by 11¼ in., black enamel, £1 12s., 750 W; "Dome," heavy frame, 2¼ kW, 20 by 13½ in., black enamel, £2 9s. 6d.; "Equata," plain rectangular, with wall fixing lugs, 1½ kW, 10½ by 14 in., £1 16s.; "Gala," 1-piece casting, including handle, 2¼ kW, 21 by 15 in., bright ebonite, £3; "Alma," sheet-metal construction on Chippendale legs, 21 by 14 in., 2¼ kW, antique, £3 4s.

General Electric Co., Ltd.:—D2452, cast rectangular frame with rounded top corner, 15½ by 15¼ in., vitreous enamelled, 2 kW, £1 18s. 6d.; D2513A, cast-panel fire, 17½ by 13 in., 3 kW, 48s.; D2448, wall model, in cast frame, vitreous enamelled, 1 kW, 9⅜ by 14½ in., 39s.; D2400, box-type fire with 6 in. hot plate in top, 15 by 14¼ in., vitreous enamelled, £3 18s. 6d.; D2504, simple design in sheet metal, inclined front, 1 kW, 15½ by 16¼ in., 43s.; D2552, inclined elements, front projecting base, 18⅜ by 15½ in., 2 kW, 3 guineas; D2517, screen-type, antique brass, 2 kW, 23¼ by 16 in., £5; D2551, ornamental-panel type, with front projecting base, 3 kW, 23⅜ by 16 in., oxy-silver. £7 5s.; D2518, cast, Tudor with dogs, 2 kW, 16½ by 23½ in,. £6 15s.; D2516, ornamental, with front curved wings, sheet metal, 3 kW, 23 by 25 in., bronze, £8 15s.; D2463, "stone" frame appearance, 3 kW; D2403, slot-meter fire.

Belling & Co.:—"Empire," inclined front, wide vents at top, spread legs, 2 kW, 16 by 14 in., bright black, 23s.; "Victor," cast, inclined elements, rounded top corners, 13½ by 14 in., 2 kW, 25s.; "Hungalow," sheet steel, with cast-iron top, inclined front, 17 by 13¼ in., 2 kW, antique copper, 36s.; "Boudoir," light construction, with front projecting base, 24½ by 14 in., 3 kW, oxy-brass,



One of the "P.H." convectors (Greene, Phillips)

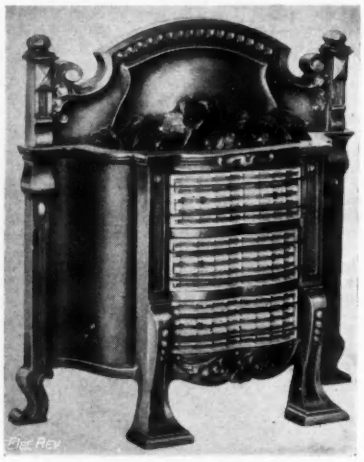
£4; "Turnbar," box-type, front top bar element pivoted for use in horizontal position for cooking, 16 by 15½ in., 2 kW, bright black, £2 18s.; "Adam," ornamental, with curved wings and dogs, 24½ by 29 in., black and copper, 4 kW, £5 5s.; "Olympian," sideboard construction, with recessed front elements, 22 by 16 in., 3 kW, oxy-copper, £7; "Vestibule," recessed element below canopy designed for convected heat, extended wings and dogs, 28 by 24 in., 3 kW, art bronze with chromium well, £6; "Modum," arch shaped, plain but not severe, 15 by 20 in., 2 kW, mottled enamel, £4; "Studio," cubist design, 18¼ by 20 in., 2 kW, mottled enamel, £3 15s.; "Fixall," bathroom wall heater, 17¼ by 14½ in., matt black, 2 kW, £2; "Hearth" fire to occupy place of ordinary fireplace, inclined elements, guard trivet, 16 by 8½ by 5½ in., 2 kW, 40s.; "Convexo," plain semi-cylindrical, 25 by 16½ in., 3 kW, bronze, £3 10s.

John Shaw & Son:—"Lichfield," plain cast with vents in top, 2 kW, 28s. 6d.; "Junior," cast ornamental, elements

A "Highlow" air warmer

slightly recessed, stoved black, 2 kW, 20s.; "Crescent" 27, cast, squat, with outward curved feet, 2 kW, 13½ by 18 in., £2 6s.; vitreous enamel; "Crescent" 37, plain, with rounded top corners, 2 kW, 14½ by 15½ in., stoved black, 25s. 6d.; "Crescent" 30, inclined front, top vents, 1 kW, 10¾ by 14½ in., art black, £1 3s.; "Governor Junior," recessed elements in plain frame stoved black, 1 kW, 10s. 6d.

Hattersley Bros., Ltd. ("Swinton"):—No. 50, inset fire for wall or fireplace, 2



A Premier fuel fire

kW, 12½ by 12½ in., oxy-copper, £1 17s.; No. 42, circular front with sweeping legs, 19 by 12 in., 3 kW, oxy-copper, £2 5s. 6d.; No. 19, squat with stubbed legs, 1 kW, 11 by 14 in., vitreous enamel, 16s. 6d.; No. 25, end curved, top with handle, 17 by 17 in., 2 kW, stoved black, 32s. 6d.; No. 26, recessed bars, front trivet, fire-grate shape, 2 kW, 16 by 16 in., vitreous enamelled, £2 2s. 6d.; No. 40, plain curved, 16 by 16 in., 2 kW, stoved black, £1 12s. 6d.; No. 41, curved front, flat top, 17 by 14 in., 2 kW, stoved black, 32s. 6d.; No. 29, front projecting top and base, 2 kW, 16 by 13 in., stoved black, n.p., 42s. 6d.; No. 23,

An Arora radiator

plain rectangular with handle and curved front projection, 20 by 16 in., 3 kW; vitreous enamelled, £3 2s.

Carron Company:—"Canterbury," inclined front, overall loop handle, front projecting, 22 by 15½ in., 2 kW, black enamelled and n.p., £2 10s.; "Durham," plain box type with hot plate in top, 19 by 15 in., 2 kW, black enamelled, £3; "Argus," plain, curved inclined front, 17⅛ by 16 in., 3 kW, art silver, £2 6s. 6d.; "Jupiter," projected panel front with plain curved surround, 22 by 17¼ in., 3 kW, black enamelled, £2; "Andromeda," inclined front, rounded corners, 20 by 15¼ in., armour bright, £2 10s.; "Neptune," ornamental with top trivet, 17⅜ by 13⅜ in., black enamelled, 23s.; "Orion," cast, wide base, recessed element, 1 kW, 10¾ by 17 in., art copper, 15s.; "Capella," plain rounded corners and projecting base, 1¼ kW, 13 by 15 in., art copper, £1 7s. 6d.; "Mercury," inclined front, plain box type, 16½ by 14 in., 2 kW, art copper, £1 15s.; "Regulus," projected panel and further projecting base, 19½ by 15½, 2 kW, porcelain enamelled, £2 5s.; wall heater, 8¾ by 12¾, 750 W.

Premier Electric Heaters:—"Eton," sector elements semi-recessed, top vents, 15 by 16 in., 1½ kW, antique copper, £2 5s.; "Durban," ornamental, inclined projecting elements, bottom trivet, 1½ kW, 14¾ by 13½ in., antique copper, £2 7s. 6d.; "Albion," vertical inclined element bars, cast with handle, 2 kW, 19½ by 12 in., matt black, £2 10s.; "Avon," Queen Anne style, 3 kW, 24 by 16 in., antique copper, £4 12s. 6d.; "Isis," inclined panel recessed in "solid" frame, 2 kW, 16½ by 15½ in., gloss black, £2 10s.; "Clyde," inclined recessed elements, plain frame, rounded corners, trivet attachment, 2 kW, 15 by 15½ in., enamelled, £2 6s. 6d.; "Medway," inclined front, wide legs, 1 kW, 14½ by 14 in., gloss black, £1 2s. 6d.; "Bedford," light box type with top vent, 17 by 13 in., antique copper, 2 kW, £2 7s. 6d.; "City," antique copper, 1 kW, 17s. 6d., 10½ by 13½ in.

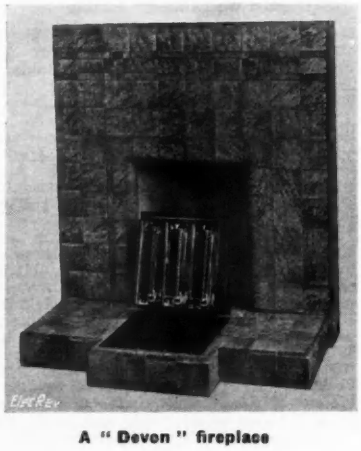
Berkeley & Young, Ltd.:—"Panelle," for permanent fixing in tiled surround, 2 bars, bi-colour, £1 8s. 6d.; "Verriot," plain cast frame, 2 kW, black, £1; "Popular," rectangular with handle, 1 kW, 17s. 9d.; "Oxford," inclined front-projecting base, 3 kW, black and copper, £3 9s.; "Crown," smooth curved frame, 1 kW, black, 15s. 6d.; "Amazon," designed for tiled surround, dome top, vitreous enamel, £2.

Edison Swan Co.:—"Utility," inclined elements, top vents, scroll bottom, 3 kW, oxy-copper, £2 14s.; "New Utility," box type with scroll legs for use for fire or cooker, 750 W, £1; "Popular," recessed elements in plain curved frame, stoved black, 27s. 6d.; No. 146, sheet metal with vertical bar elements, 3 kW, armour bright, £2 2s.

Falkirk Iron Co.:—"Gem," projecting elements from plain surround, 2 kW, 17½ by 16 in., porcelain enamel, £1 18s.; "Coral," recessed elements in plain squat frame, 2 kW, 13½ by 15 in., porcelain enamel, £1 18s.; "Barray," recessed elements, 3 kW, 18 by 15½ in., £3.

Siemens Electric Lamps & Supplies:—("Xcel"), "Homely," recessed element in plain cast frame, 2 kW, 15 by 13½ in., sprayed bronze, 24 in.; "Gordon," projected front, 2 kW, 18 by 14½ in., art black, £2; "Chiltern," typewriter shaped, vertically inclined bars, 3 kW, 16 by 15 in., £2; "Langham," panelled elements in ornamental box, 2 kW, 18 by 13½ in., art black, £2 5s.; "Rodney," plain, rounded corners, base trivet, 3 kW, 22 by 17 in., art black, £2 14s.; "Renown," sharp corners, 3 kW, 22 by 14 in., art black, £2 17s. 6d.; "Malvern," recessed elements, top, bottom and side copper reflectors, 2 kW, 15 by 13½ in., £2 2s. 6d.; "Nursery," top inclined elements, 1,000 W, 10¾ by 13 in., £4 7s. 6d.; special panel fire for tiled surrounds, 3 kW; bathroom fire, wall fixing, 750 W, 13 by 12 in., £2 2s. 6d.

Credenda Conduits Co., Ltd.:—"Trivet," sheet metal, inclined front, 14½ by 12½ in., 2 kW, black and copper, 26s.; "Imp," cast frame, rounded corners, 1 kW, 10½ by 14 in., aluminium silver, 18s. 6d.; "Ajax," plain frame with spread feet, 14 by 14¾ in., 1½ kW, vitreous enamelled, 27s. 6d.; "Rity," projected front, slightly curved, 16 by 16½ in., 2 kW, black, 35s.; 3 kW, 19 by 18 in., black, 40s.; "York," four tall legs, 2 kW, 19 by 14½ in., black, 25s.; "Popular," inclined front, flat top, projecting bottom, 2 kW, 15½ by 12¼ in., black, 33s. 9d.;

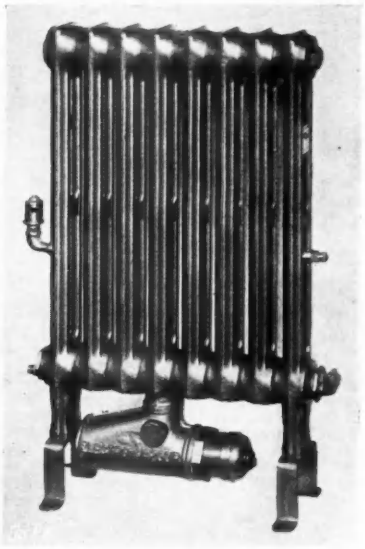


A "Devon" fireplace

An elegant "Xcel"

"Graceful," inward curved front, pillar legs, 21 by 15 in., 3 kW, antique brass, 75s.; "Majestic," 3 bar elements above one inclined, dog legs, 4 kW, 24 by 20½ in., bronze, 79s. 6d.; "Insert," three separated bars, in plain frame for existing opening, 3 kW, 20 by 14 in., bronze, 44s.

Arora Co.:—No. 105, box type for use as cooker, 18 by 7 in., 1½ kW, 35s.; "Empire," panelled elements under fireplace hood, projecting base, 28 by 15 in., oxy-copper, £11 10s.; "Bathroom," 12 by 12 in., 2 kW, 40s.; "Haven," plain rounded-



Benham hot-water equipment

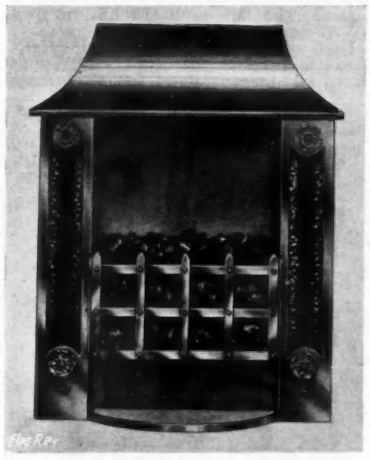
corner frame, tall legs, 2 kW, 16½ by 14 in., matt black, £1 7s. 6d.; "Victoria," pillar construction, flat top, 2 kW, 19½ by 16½ in., antique brass, £4 6s.; "Standard," deeply recessed elements, dog legs, 4 kW, 22⅜ by 19⅜ in., matt black, £5 10s.; "Portland," easel construction, flat top with vents, 2 kW, 17 by 13 in., oxy-copper, £3 17s. 6d.; "Robust," S-curved front, 21 by 15 in., 3 kW, £3 10s.

W. A. Froy & Sons, Ltd.:—Panel fire for fitting in tiled surrounds, 3-bar, 3 kW, black japan, 18 by 12 in., £3; with tiled surround, shelf and hearth, £7 18s., c.p.

Mayall & Co., Ltd.:—Sheet-metal fires, sprayed oxy-copper, folding feet, 1,000 and 2,000 W.

Falk, Stadelmann & Co.:—"Imp," rectangular, 13½ by 9¾ in., single 650-W element, 13s. 6d.; "Domestic," plain, with rounded edges, 11s. 6d., 1 kW, 13½ by 11¼ in.; "Fireside," flat top and vertical elements, 1 kW, 14 by 11 in., 14s. 6d., in black; "Comfort," sheet-metal body incorporating a hob on which food can be kept hot, rectangular frame, 1-kW model, 12½ by 14 in., 18s. (black); "Jewel," 14 by 19¾, 1.3 kW, 42s.; "Omega," horizontal elements, sloping back slightly, 3 kW, 15⅜ by 19⅜in., 54s.; "Heatwave," inset, £3 10s., 3 kW, 14¾ by 16½ in.; "Oxford," modern and simple, but striking design.

Revo Electric Co., Ltd.:—"Regent," 1 kW, black, 10¼ by 13¾ in., 11s.; "Selmore," sheet steel, 10 by 9½ in., with handle, 1 kW, 8s. 6d.; "Caliph," cast iron frame, 11 by 14 in., 1 kW, 13s.; "Commerce," wall fire, with shockproof switch, 1,500 W, 11 by 11½ in., 24s. 6d. (in black); "Challenge," vertical elements, handle on top, 1 kW, 14 by 14 in., 17s.; "Pearl," 16½ by 16½ in., 1 kW, 44s. 6d.; "Office,"



A "Heatrae" fire (Electric Fires, Ltd.)

smooth, clean exterior, sturdy, vertical 2-kW element, 14½ by 18 in., 38s.; "Study," cast iron, for use in a study or library, flat top about 5 in. deep, 2 kW, 15 in. by 17 in., 52s.; "Priory," plain lines with wide surround, 27 by 22 in., 3 kW, 55s.; "Kelso," three "Revo Radiobar" spiral almost vertical elements, separate reflectors, 23 by 13¾ in., 3 kW, £3 15s.; "Edinboro'," element at an angle of about 60 degrees from horizontal, 19 by 14½ in., 3,000 W, £4; "Stirling," plain, 24 by 26 in., fitted with dogs, 3 kW, 5 guineas; polished aluminium, 3 kW, 22 by 17½ in., £8; "Chester," fitted with a glass back, 21½ by 25½ in., 3 kW, £8 10s.

Bratt, Colbran & Co.:—No. 96, bronze, with tile surround, 28½ by 35½ in., 1 kW, £4; No. 65N, designed to fit into tiled surround, 18½ by 27½ in., 3 kW, stoved enamel, £5 10s.; No. 69, "Nassau" elements, set in roll-top desk-shaped top, 22 by 16 by 9 in., bronze, £8, complete with architrave, marble hearth, etc., £39 12s. 6d.; No. 87N, screen-type front with side extended front legs, bronze, 3 kW, £7 15s.; No. 45N, for use in makers' coal or electric fire, 14½ by 25 in., 3 kW, stoved enamel, £5; No. 88, pedestal type, 13½ by 17¼ by 4¾ in., 3 kW, bronze, £1 17s.; No. 94, cast frame with curved front, 15 by 16 by 5 in., 2 kW, n.p., £3; No. 89, wall heater, 13¾ by 9 by 2¾ in., £2 5s.

Midland Metal Spinning Co., Ltd.:—Bar fire, black enamelled, with hot plate, 600 W, 5s. 11d.

Low-temperature Equipment, etc.

Tubular heaters are generally loaded for domestic use at 60 W per foot length of tube. Brackets are included unless separate prices are given.

Archibald Low & Sons:—"Highlow," from 2 to 17 ft. lengths, 10s. to 54s.; window heaters, from 2 to 8 ft., 25 W per foot, from 30s. to 54s., brackets 1s.; mahogany, black, aluminium, gilt, or bronze finishes.

Credenda Conduits Co.:—2 to 17 ft. lengths, from 12s. to 57s.; up to six-tier heaters are also supplied.

Siemens Electric Lamps:—2 to 17 ft. lengths, 12s. to 57s., loading not standardised; multi connector for tubes in banks of 2, 5s., brown or aluminium.

H. W. Sullivan:—"Tubula." 4 ft., 50 W, per foot, antique copper, £1 16s., fixing brackets, 1s. 3d.

George Green & Co. ("Gee-Gee"):—2 to 10 ft. lengths, 12s. to 36s., metallic paint finish.

Electroway, Ltd.:—2 to 18 ft. lengths, 66 W per ft., 12s. to £3, finished dark oak, aluminium, bronze, or black; multi-tier models for halls, etc., also provided.

Walker, Hunter & Co.:—2 to 8 ft. lengths, 12s. to £1 10s., up to 18 ft., 3s. per ft. extra, hand-finished aluminium or dark bronze paint; window heaters, 24 to 120 in., 7 to 350 W, hand-finished bronze, 12s. to 36s. 18-in. desk heaters, 12s.; car heaters, 15s.

Tubular convectors, 2 to 15 bars, 400 to 3,000 W, 37 by 6½ in. to 37 by 39 in., from £3 5s. to £13.

Wardle Engineering Co., Ltd.:—"Maxheat" tubes of oval section in 2 to 17 ft. lengths, 60, 70, or 80 W per foot, 12s. to 57s.; two- three-, and four-tier radiators, 240 to 1,920 W, 30s. to 121s.

Illuminated convector heaters, 500 to 6,000 W, floor mounting, from 24 by 13 by 6 in. to 30 by 38½ by 4⅞ in., £3 18s. to £15; wall mounting, from 21¼ by 12½ by 4½ to 27½ by 38 by 5⅜ in., £3 14s. to £14; plaque heaters, nickel-chrome wire embedded in ceramic material, 14 in. diameter, 500 W, £2 10s., with switch and 18 in. of chain.

Bratt, Colbran & Co.:—"Mortimer" tubes in lengths from 4 to 12 ft., 240 to 720 W, £1 15s. to £3 15s.

Revo:—Tubular heaters at prices ranging from 1s. 6d. for 2 ft. up to 16 ft. at 3s. for each extra foot above two.

Falk, Stadelmann:—"Efesca" tubular heaters, at 12s. for 2 ft. length, and then 3s. per foot up to 18 ft.

Benham & Sons:—Electro-vapour radiators are available at from £6 to £14. Tubular heaters, heavy pattern, 3 ft. long, 180 W, £1 12s. 6d.; light pattern, 12 ft. long, 720 W, £2 2s.; "Panelray" radiant heaters, suitable for use under windows, from 1 ft. 4 in. to 2 ft. high, 2 ft. 8 in. to 4 ft. long, all 1 in. wide, with 2½ in. projection, 625 to 1,250 W, from £3 10s.

Barker, Young & Co., Ltd.:—"Unity," 2 ft. to 17 ft., 12s. to 57s., surface temperature 180 deg. F.; a four-tube portable heater in dark oak cellulose, 2 ft. 4 in. overall, £4 17s. 6d., 600 W; linen cupboard heater, 2 ft., 120 W, 17s.; car radiator heater, 1 ft. long, with end handle, 60 W.

The "Morganite" radiator has a graphite resistor embedded in a ceramic plate, normal operating temperature, 400

Soapstone radiator with visible element

deg. F., back connection for conduit or l.c., c.t.s., or flexible cables. Selected models, No. 11, 25 by 13 in., 1,250 W, £4 18s.; No. 12, 13 by 12 in., 600 W, £3 13s.; No. 13, 25 by 5 in., 500 W, £3 4s. "Morganite" heat and light unit, welded steel or brass frame construction, oxidised or chromium plated, with panels of opal or coloured glass and "Morganite" heating elements, No. 306, 26 by 9 by 9 in., 1,000 W, £12; No. 301, 26 by 9 by 9 in., 500 W, £8; No. 401, 20 in. dia., 15 in. deep, 400 W, £8 10s.; No. 355, 40 in. square by 9 in. deep, 2,000 W, £27. The "Electrorad" radiator is a flat cast-iron plate which can either be applied to or recessed into the surface of walls to match decorations. A model 24 in. by 37 in., 400 W, costs £3 14s.; 30 in. by 8 ft. 5 in., 1,620 W, £12.

Soapstone Products Co.:—Radiators manufactured from natural quarried soapstone. No. 210, bathroom model, totally enclosed, 300 W, £3 5s., 12½ by 14 in.; No. 129, for rooms of 1,000 cu. ft., with visible element, 900 W, 18½ by 13¾, £3 19s. 6d.; No. 165, 2 kW, for central heating, pillar construction, totally enclosed, 20½ by 24½ in., £7 15s.

Sun Electrical Co., Ltd.:—The "Primo" hot and cold air diffuser incorporates a fan and heating elements, 740 W combined loading, 12½ in. by 10¾ by 7 in.

Archibald Low & Sons:—"Highlow" hot-water radiator, type S, from 23 by 16 in., to 38 by 46 in., 500 to 3,000 W, £5 5s. to £14 5s.; type R, 13 by 13 in. to 13 by 55 in., 500 to 3,000 W, £6 5s. to £18 10s.; air warmers, vertical and horizontal mounting, 600 W, 32s.

Belling & Co.:—"Handy," 250-W unit in perforated container, 4½ by 14½ by 5½ in., 20s.; air warmers, low-temperature spirals in projecting-fin castings, 3 kW, 23½ by 30 by 7 in., £7 18s.; hot-water radiators, 2 kW, 37½ by 36 by 5 in., £13 10s.

Credenda Conduits Co.:—"Vectus," a convection heater and boiling ring, with

Two "Tricity-Sunray" models

a cover which gives the appearance of an oil stove, 24 by 14½ in. dia., 32s. 6d.

Siemens ("Xcel"):—Hot-water radiators, from 24 by 11 in. to 36 by 29 in., 400 to 2,200 W, £4 to £12.

Geo. Bray & Co., Ltd.:—"Chromalox" portable radiators with perforated covers with solid tops, No. 2420, 2 kW, oxy-copper, 190s.; No. 2430, 3 kW, black, 89s.; wall type, No. 2030, 3 kW, 27 in. long, 89s.; portable radiator, 500-W element in perforated container, 20 in. long, 30s.

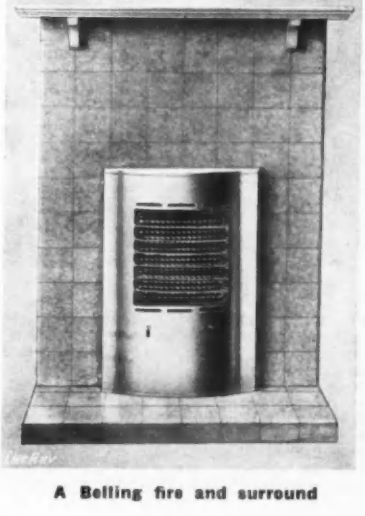
Geo. Nobbs & Co.:—"Genii" panel or wall hot-water radiators, unit construction, sections 16 and 32 in. high, 200 and 400 W, for assembly side by side or back to back, single section, 400 W, 3-heat, £4 5s.; floor radiators, cast sections screwed together, from 500 to 2,000 kW, 24 to 36 in. high and 12 to 34 in. long, £5 10s. to £13 10s.

F. Turner Art Metal, Ltd.:—Surrounds for electric fire in any art metal finish to choice, or in special figure-marble finishes for blanking in coal grates.

Greene, Phillips & Co.:—P.H. convectors. Bookcase-shaped model, 30½ by 32 by 32½ in., 500 W, Jacobean oak, 5 guineas; curved top, with corrugated front panel, 750 W, 31¾ by 23¼ by 10½ in., £6 10s.; flat top with corrugated front panel, 1,000 W, 31½ by 31½ by 11 in., £9 5s.; flat top with front radiator (convected or radiant heat), 1,000 W, 31½ by 30½ by 11¾ in., £11; corner model, 500 W, 29½ by 19½ (bow) by 12½ in. (sides), £6; window-seat equipment, 375 W, 13½ by 31¾ by 7¼ in., £4 10s.

Grierson, Ltd.:—"Dulrae" system consisting of a wire mesh element embodied in a special compound $\frac{1}{16}$ in. thick, made up like wallpaper; loading is 23 W per sq. ft., and working temperature 120° F., surface temperature 90-95° F.; automatic temperature control.

Edison Swan Electric Co.:—"Ediswan" tubular heaters from 2 ft., 12s., up to 17 ft. at 3s. per foot over 2 ft.



A Belling fire and surround

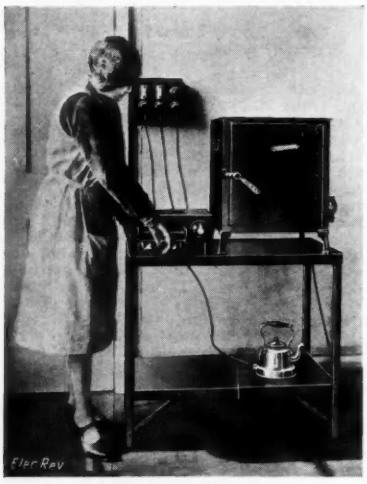
Section III.—Cooking Equipment

Embracing a variety of small kitchen appliances

Excluding the devices generally known as "breakfast cookers," that is, those in which there is no oven served by its own elements exclusively, boiling-plate units, and all classes of table appliances, there are at least a hundred cookers—the products of about twenty manufacturers—available in this country

THERE is a growing tendency for the makers to limit their products to a few models, which appears to be a step towards standardisation, if not the "standard cooker."

For instance, Domestic Electrification, Ltd., markets four "Dolphin" models with loadings varying from 3,910 to 6,700 W. The smallest, No. 2, can be purchased in standard finish (mottled hob, white door panels, stove black legs, &c.) for £11 17s. 6d. It has two circular hot plates and a grill which also serves as the top oven element. The oven cooking space is 14 in. by 12 in. by 12 in., and the oven loading is 1,810 W. The largest model has two round hot plates and a separate grill, the oven cooking space being 16 in. by 14 in. by 16 in., and the oven loading 2,000 W. In standard finish this cooker costs £17. The intermediate models, with total loadings of 5,000 and



An Arora cooking outfit

6,100 W, in all mottled grey finish, cost £15 15s. and £17, respectively. For 18s. extra the "Dolphin" cookers can be fitted with a kettle switch-plug and fuse.

The socket for a kettle is also a feature of some of the equipments produced by Siemens Electric Lamps & Supplies, Ltd.,

The first English Electric model

who have a range of five cookers available with total loadings of from 2,500 W for the "Xcel Minor" to 7,550 W for the largest of the range, a table cooker with three boiling plates and a grill. It has an oven cooking space of 3,840 cu. in. (2,400 W). The overall dimensions are 56 in. high, 23 in. deep, and 49 in. wide. The "Xcel Minor" can be purchased with or without a stand. It has bottom oven heating (1,000 W) and a 1,500-W grill boiling plate also serves the oven. The three models between these two have total loadings of 4,100, 6,100, and 6,750 W, respectively. Vitreous enamel is to be adopted as the standard finish.

Vitreous enamelling throughout as standard finish also applies to the equipment produced by Belling & Co. There are twelve cookers available, but a scheme of standardisation provides for duplication in the ten larger models; that is, there are five pairs with the same loadings, each pair representing one vertical and one horizontal (table) model. Except that the hob unit and the oven are arranged side by side on the usual stand, and that it has an additional warming cupboard on top of the oven, as well as a high splash plate, the table model parts correspond with those of the vertical model.

The total loadings of the "duplicated" cookers vary from 3,950 to 10,800 W, the smallest model having its hob equipped with a 2,250-W boiler-griller only. The largest one has a boiler-griller of the same size, in addition to three boiling plates. Oven cooking spaces of from 12 in. by 11⅜ in. by 11¼ in. to 16 in. by 18 in. by 16 in. are available. The three intermediate cookers have aggregate loadings of 5,050, 5,650, and 7,150 W, respectively. Prices for the vertical models are from £8 10s. to £19, and for the horizontal models from £11 10s. to £24. The remaining two Belling cookers may also be classed under one head, for the "Baby" is available with or without a stand for £6 17s. 6d. or £5 17s. 6d. This little appliance has a total loading of 3,250 W, with top and bottom oven heating, and a 2,250 W boiler-griller, which also serves the oven.

In the equipment produced by Falk, Stadelmann & Co., Ltd., there is included another popular model of the "baby" type (with stand £6 16s. 6d.). This "Efesca Midget" is the smallest of a range of eight models of which the "Giant" heads the list for size, having a total loading of 8,600 W. It has a separate grill and three boiling plates and sells at £17 19s. 6d., all enamelled. Again, there is a measure of duplication in this range, for the "Minor" and "Media" have also their corresponding table models. A total loading of 3,600 W for the "Minor" vertical model represents the oven and boiler-griller only, but in the "Minor" table model, oven, boiler-griller, and one boiling plate give a total load of 4,460 W. The two "Medias" each have a boiler-griller, and one boiling plate, with slightly different loading (table model 15 guineas).

An effort at general simplification and economy in price, overall dimensions, and loadings, seems to have been the idea underlying the "Matchless Minor." For £8 15s. (black) one can secure a 10 in. by 12½ in. by 13 in. oven cooking space, a boiler-griller, and one boiling plate, with overall dimensions of 34½ in., 21½ in., and 20 in. An oven switch under the oven is an unusual feature pertaining to this and other "Efesca" models. At £14 17s. 6d. and with a total loading of 6,600 W (boiler-griller and two plates), the "Major" completes the "Efesca" range.

Switches in the main body is also a point of note in the "No. 293" cooker produced by Credenda Conduits Co., Ltd. From the smallest of the "Creda" range this ranks third on the list. In standard finish it costs £9 3s., measuring overall 34 in. by 20 in. by 16 in., with a total loading of 4,350 W. Smaller cookers are a neat model on tall legs with a shelf between them, and the "No. 2" cooker with a total loading of 2,800 W.

Five larger vertical models have total loadings of 5,900, 6,900, 7,600, 7,600 and 8,600 W. In standard finish these cost from £13 3s. 6d. to £20 7s. 9d. The two with similar loadings differ in oven cooking spaces of 15 in. by 14 in. by 14½ in. for "No. C296," against 14 in. by 16 in. by 16 in. for "No. C200." Except the smallest of these five they each have a separate boiler-griller and two boiling plates. "No. 294" has only one boiling plate. Substantial hot cupboards are provided in all but the two smallest "Credas." "No. C298" (8-12 persons) has an oven and a large hot cupboard side by side, a boiler-griller, and two hot plates. The hot cupboard has its own 600-W element. Price £24 5s.

Each of the cookers produced by the Jackson Electric Stove Co., Ltd., has switches incorporated in the main

The smallest Belling

body, while the hot-plate supporting frame, &c., can be removed without tools. Of the seven models the latest arrival, "No. 91J," is the smallest, with oven cooking space of 10⅜ in. by 10⅜ in. by 10⅜ in., but its total loading of 5,000 W is slightly above "No. 62" cooker, which has a 12 in. by 13½ in. by 13 in. oven space and 4,900 W overall loading. In standard finish the "No. 91J" costs £8 15s. Each of these models has one boiling plate in addition to the boiler-griller, as has the next in size, "No. 64," which has an oven cooking space of 13½ in. by 14⅛ in. by 15 in. oven and total loadings of 2,000 and 5,600 W, respectively, and costs £13 15s. 6d.

An "Xcel" intermediate; 4,100 W

The next two in size have two boiling plates each and total loadings of 6,600 and 7,700 W, respectively. The two largest models have three boiling plates each, are loaded at 8,700 and 10,040 W, and cost £17 7s. and £19 18s.

In a few of the models produced by the General Electric Co., Ltd., the incorporation of the switches in the main structure is also a feature which gives rise to a wider hot cupboard. The range covers models with loadings of from 2,600 W to 9,700 W. The smallest cooker is one mounted on legs with a large grill boiling plate which also serves the oven. Price £7. The largest has oven dimensions of 16 in. by 16 in. by 18 in., three

A " Highlow " with one utensil socket

boiling plates, and a separate grill. In porcelain enamel finish it costs £22 10s. Another " Magnet " (£16 10s.) is the D.C. 5759. It has oven cooking space of 12¾ by 13 by 14 in., two boiling plates, and a large grill. The " Magnet Minor " is available in two models with loadings of 3,500 and 3,900 W. In black enamel the small unit costs £5 15s. Loaded at 4,950 W the D.C. 5768 has oven space of 12 by 12 by 11¾ in., one boiling plate and a separate grill; it costs £11 15s. in porcelain enamel.

Nos. D.C. 5740 and 5774 are similar models, except that the former has three boiling plates in addition to the grill, while the other has two plates and is loaded at 7,900 W, as compared with 6,900 W. These are priced at £19 17s. 6d. and £18. Nos. D.C. 5735 and 5736 are squat cookers without hot cupboards, loaded at 7,400 and 9,000 W (three and four boiling plates). A table model at £21 completes the range. It has three boiling plates and a 16 in. by 16½ in. by 13 in. oven interior.

A " Universal " warming plate

There is also the G.E.C. thermal storage cooker, which is available in grey porcelain enamelled front frame and top for £18 18s. The oven cooking space is 14 in. by 14 in. by 14 in., and it has a 500-W boosting element at the bottom of the oven. The thermal-storage block serves two hot plates, and the oven has a 500-W element which is constantly in circuit.

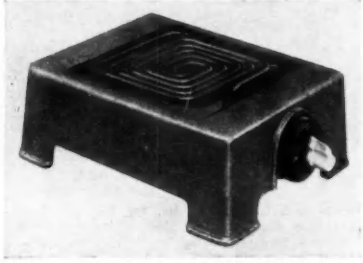
Switches mounted on the splash plates strike a distinctive note in four of the eight cookers produced by the Manor Electric Oven & Fire Co. Three of these are table models, No. 1266 having a boiler-griller and a total loading of 3,000 W. No. 1267 has a second boiling plate and 5,100-W total loading, and No. 1275 a third boiling plate and 6,950 W. The oven and overall dimensions of the last unit are 15 in. by 14 in. by 16½ in. and 52 in. by 48 in. by 20 in., respectively. Two vertical models with switches on the splash plates are Nos. 1259 and 1261, with total loadings of 5,400 and 6,750 W and one and two boiling plates in addition to the boiler-griller, respectively.

A smaller vertical model with switches on either side of the hot cupboard between the hob and the oven is No. 1273, loaded at 5,400 W, and of similar construction are two larger models, Nos. 1270 and 1272, with total loadings of 5,400 and 6,750 W. All in standard finishes, the prices of these cookers are from £7 8s. 6d. to £19 3s. 6d.

Prices ranging from £5 10s. to £35 and loadings from 2,600 to 9,400 W indicate the extensive selection of equipment manufactured by the British Electric Transformer Co., Ltd. The " Tot " and " Tweeny " are the two smallest models, and the " Tweeny " at £10 19s. 6d. has a total loading of 4,600 W and a boiling plate in addition to the boiler-griller, as compared with 2,600 W and the boiler-griller only of its small brother. Next in size is No. 758 with an oven loading of 12 in. by 13 in. by 12 in., and the No. 720 with 14 in. by 14 in. by 12 in. oven space.

No. 800 has overall dimensions of 37 in. by 26 in. by 21 in., an oven cooking space of 14 in. by 12½ in. by 14 in., two boiling plates and a separate grill, and costs £15 17s. 6d. Excluding a table cooker with a total loading of 9,400 W, three boiling plates and a grill, which costs £35, there are four larger cookers with total loadings of 7,300, 7,650, 8,500, and 9,000 W.

A recent " Tricity " enterprise is the provision of built-in cooking equipment; that is, apparatus incorporated in the structure of the premises, &c. The idea was developed in connection with a London building estate. An oven of 14 in.



A " Hotpoint " portable boiling plate

by 14 in. by 12 in. and loaded at 1,800 W costs £11 complete.

Provision for plugging in self-contained electric utensils is made in the equipments of Archibald Low & Sons, Ltd. Six " Highlow " models are available with total loadings, excluding utensils, of from 4.8 to 7.6 kW. The lowest loading of 4,800 W applies to table cooker, No. 218, with 12 in. by 12 in. by 12 in. oven cooking space (1,500 W) a grill, simmering plate, and three utensil sockets (£17 1s. 3d.). A similar cooker has four utensil sockets and 2,500-W oven loading.

Of the four vertical " Highlows," No. 219 (£17 1s. 3d.) has a total loading of 5.8 kW, and No. 119 is loaded at 7.6 kW. Except that the latter has an additional boiling plate (1,800 W) with one utensil socket, and the former only one plate with two utensil sockets, these two cookers are almost identical, with 16 in. by 16 in. by 14 in. oven cooking space. Nos. 17 and 19 are without the utensil-socket feature, but they can be fitted with the usual plug and socket for a kettle, &c. No. 17 is loaded at 6.2 kW, and measures 25 in. by 22 in. by 36.2 in. overall, while No. 19 is loaded at 7.6 kW and measures 27½ in. by 24 in. by 36.2 in. overall. No. 17 costs £14.

Of the fifteen " Universal " equipments marketed by L. G. Hawkins & Co., Ltd., ten are of the table type and one of the remainder is a combination electric and coal cooker. The vertical models vary in total loadings from 4,600 W (12½ in. by 14¼ in. by 11⅜ in. cooking space) to 7,060 W (16½ in. by 12 in. by 12½ in.). These exclude the combination

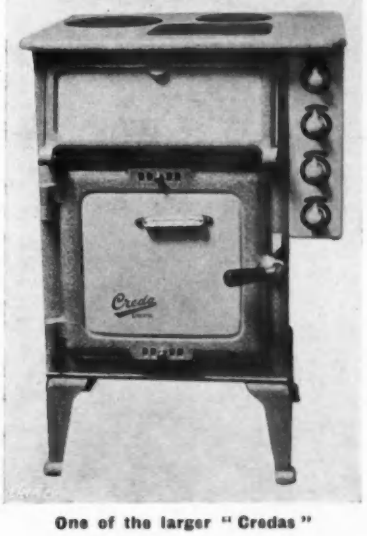
The Jackson " No. 91J "

cooker, which has three boiling plates and a " convenience outlet " (660 W). The table models vary from one with 3,160-W total loading, two boiling plates and one " convenience outlet," to a large outfit with five plates, a " convenience outlet," and two ovens, representing a total load of 16,410 W.

It is unusual to provide a hot-cupboard between the hob and oven of the smaller cookers, but one of the exceptions is the " Carronette " produced by Carron Company. With overall dimensions of 34 in. by 22¼ in. by 16½ in., oven cooking space of 12 in. by 12 in. by 12 in., hot-cupboard space of 5½ in. by 16½ in., by 13 in., one boiling plate, and a boiler-griller, this equipment has a total loading of 4,700 W, and in " de luxe " finish costs £10 4s.

This is the smallest of a range of five, and an unusual feature common to all of these is the provision of a door in the cooker side to give access to the fuses, wiring, &c. Models M1, M2, and M3 have total loadings of 6,500, 7,700, and 8,700 W, and oven spaces of 14 in. by 14 in. by 13 in., 16½ in. by 15½ in. by 14½ in., and 16½ in. by 15½ in. by 14½ in. The smallest costs £16 12s. 6d. in " de luxe " finish, and all three have kettle plugs. Model P2 is very similar to M1, but its switches are attached to auxiliary side structures. It costs £16 16s.

It is possible to purchase for ten guineas a complete cooking equipment produced by the Arora Co., including an



One of the larger " Credas "

oven with 15 by 14 by 13 in. cooking space (750 W), a 1,500-W boiling-plate unit, and a metal table 2 ft. 6 in. by 2 ft. 11 in. by 1 ft. 6 in.

Most of the cookers produced by the Falkirk Iron Co., Ltd., have switches incorporated in the main body, but under the hob. Excluding the larger models as being outside the ordinary domestic field, there are ten vertical models with loadings ranging from 4,200 to 8,500 W. The smallest of these equipments has 12 in. by 13 in. by 10 in. oven cooking space (1,400 W), and one boiling plate and a separate grill; the overall dimensions are 19 in. by 16 in. by 35½ in. Three boiling plates and a separate grill are carried by the hob in the largest unit, which measures overall 28¼ by 22½ by 37½ in. The oven loading is 3,250 W, and the cooking space is 16 by 16 by 18 in.

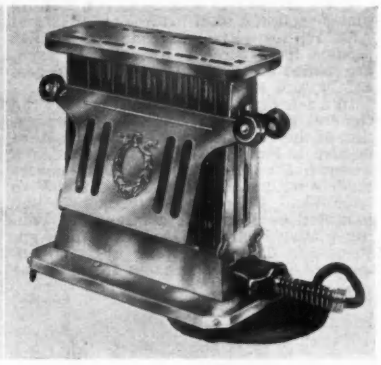
The total loadings and overall dimensions of the intermediate cookers are: 5,200 W, 19 by 17 by 35½ in.; 6,050 W, 22 by 20½ by 37 in.; 6,500 W, 26 by 20 by 36½ in.; 6,850 W, 23½ by 21 by 37 in.; 7,100 W, 25½ by 23 by 36 in.; 7,150 W, 24 by 20½ by 37 in.; 7,750 W, 26 by 22½ by 37 in.; and 8,150 W, 28 by 23 by 37 in. Two table models include No. 5299, which has a total loading of 6,750 W (oven 1,750). There are three boiling plates in the hob, grilling being provided for at the oven top. The oven cooking space is 14 in. by 15 in. by 12½ in. A large table model is loaded at 10,100 W and measures overall 53 in. by 24 in. by 54 in.

A newcomer into the domestic cooker field is the English Electric Co., Ltd., which has just introduced the first of an initial range of three. It is the medium size with overall dimensions of 23½ in. by 22 in. by 37½ in. One griller-boiler and one or two boiling plates are fitted. The oven cooking space is 15½ in. by 14 in. by 13½ in., with a loading of about 2 kW. With two plates the total loading is about 7 kW.

The small "de luxe" cooker will have overall dimensions of 23 in. by 22½ in. by 37½ in., and oven cooking space of 12½ in. by 14 in. by 12½ in. (1,800 W). It will have one hot plate and a griller-hot plate.

The Revo Electric Co., Ltd., makes a large number of different types of cookers. First there is the "Economy" range containing four models, Nos. 1, 1A, 2 and 4. No. 1, with one boiler-griller, loaded at 2,500 W, has the switches under the hob and costs £7 18s. The oven cooking space is 11⅝ in. by 13¼ in. by 11½ in., with a loading of 1,330 W. All the other "Economy" range models have a grilling chamber measuring 15½ in. by 13 in. by 5 in., the griller boiler being the same as in model No. 1. No. 1A has an extra boiling ring with an oven space of 12¼ in. by 14 in. by 13½ in. (1,330 W). Nos. 2 and 4 have oven spaces of 12¼ in. by 14 in. by 12½ in., and 14¼ in. by 15½ in. by 14½ in. (1,400 W and 2,000 W), respectively. No. 2 has a boiling plate and grill-boiler as in No. 1, while No. 4 has also a small boiling ring. The price of No. 1A is £9 7s. 6d.

The Sullivan table cooker



A Revo toaster

Other cookers include the "Chalet," costing £9 7s., which has a boiling plate, a griller, and oven space of 12¾ in. by 9¾ in. by 9½ in. (1,000 W). The "Household" cooker has a boiling plate and a boiler-griller; a 1,500-W element heats an

"Falco" cooker No. 5350

oven measuring 11½ in. by 13¼ in. by 11 in. The price is £18 17s. 6d.

There are three other larger models, the "Domestic," the "Family," and the "Maxima." The first has two boiling plates, a griller and oven space of 13½ in. by 14 in. by 13 in. (1,800 W). The second has two boiling plates and a griller, and 2,000 W serves an oven 15 by 14½ by 15 in. The last model has an extra boiling plate, and a 3,000-W element for the oven (16 in. by 16 in. by 18 in.). The prices of the three models are £13 18s., £15 10s., and £19 10s., respectively. The Revo "Superspeed" boiling plate can be fitted to all models except "Economy No. 1" at an extra cost of £4.

The same company also makes a cabinet cooker costing £24 2s. 6d. It embodies two boiling plates, a griller-boiler and a 2,200-W oven element. The overall dimensions are 49 in. by 21 in. by 38 in.

The "Magnet" thermal storage cooker

Breakfast Cookers and Boiling Plates

Generally the "breakfast cooker" is a portable unit with provision for boiling and grilling from the same element, with a hot cupboard. Such appliances are available with loadings of from 3,500 W downwards. A Carron equipment, costing £9 10s., has a total loading of 5,000 W (2,500 W griller and 2,500 W hot-plate) and a drop-down door. A similar cooker with element units of half that capacity costs £5 17s., while one priced at 40s., without a door, is loaded at 1,250 W. A grill-toaster and boiling plate loaded at 1,500 W can be purchased for £2 17s. 6d. A boiling plate 8 in. in diameter and loaded at 1,600 W costs 55s., being equipped with three-heat control. A hot plate measuring 24 by 12 in., and loaded at 2,400 W, costs £7 5s.

Messrs. Hattersley Bros., Ltd., have a cooker loaded at 3,500 W (1,500-W grill and 2,000-W hot-plate) costing £3 10s. The same company has a 1,600-W boiling plate (12 in. by 6 in. by 12 in.).

A Belling equipment at £3 further extends the standardisation scheme already referred to in that it is, in effect, the hob unit of the 33 B, 33 BH cookers, without the necessary additional switches.

The "Simplex" cooker produced by Messrs. Walker, Hunter & Co., Ltd., is available with loadings of 1,500, or 2,000 W in the same sized structure at £2 5s. (stove black).

The "Efesca" breakfast cooker costs £2 15s., is loaded at 2,000 W, has a drop-down door, and measures 8¼ in. by 15 in. by 10½ in. The hot-plate of the same name, which is sold at £4 8s., is in effect the hob unit of the "Matchless Minor" cooker, while the company sells an oven at £5 with a cooking space of 10 in. by 12½ in. by 13 in., and a loading of 1,360 W. A 600-W round boiling plate is available at 12s. 6d., and a rectangular one with a three-heat switch at 20s. The "Penketh" warming plate, measuring 14½ in. by 10½ in., and loaded at 120 W, costs 66s.

The Manor Company sells a breakfast cooker loaded at 1,600 or 1,800 W at £2 17s. 6d., and also a boiling plate with the larger loading at £2 8s. 6d.

A "Creda" breakfast cooker (£4 5s. 8d.) is loaded at 3,300 W (1,800-W boiling plate and 1,500-W grill), and has a chamber 6 in. by 12 in. by 12 in. Five "Creda" boiling rings varying in sizes and loadings from 4½ in. to 8 11/16 in. diameter, and from 500 to 1,800 W, cost from 15s. to 27s. 6d. A copper plate warmer measuring 16 by 10 in., and loaded at 200 W, costs 60s.

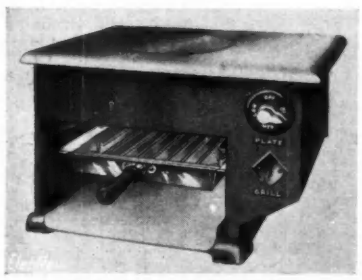
"Tricity" equipment includes a breakfast cooker, a grill, and single- and double-plate boiling units. The cooker weighs 26 lb., is loaded at 1,600 W, and is priced at £2 8s. 6d.; the grill weighs 40 lb., is loaded at 1,600 W, and costs £6 10s., and each of the plates in the boiling units is loaded at 1,600 W. The smaller plate costs £2 2s. 6d. The cooker and the grill have drop-down doors. Attractive rectangular and circular warming plates are

also available—14 by 9 in., 150 W, 20s., and 7 in. dia., 60 W, 21s.

H. W. Sullivan, Ltd., produce a breakfast cooker at £2 19s. 6d., which weighs 20½ lb. and is loaded at 1,500 W. The "Vita" table oven has a cooking space of 8½ in. by 12 in. by 8½ in. and a loading of 1,200 W, and is listed at £2 2s. The

The Bulpitt steam cooker

"Secura" boiling plate (£2 3s. 6d.) is loaded at 1½ kW, and the "Serva" warming plate (£2 7s. 6d., copper polished), loaded at ⅓ kW, measures 10½ in. by 17 in.



Hattersley breakfast cooker

The "Trojan" combination breakfast grill made by John Shaw & Sons, Wolverhampton, Ltd., is designed to serve as a fire also. Costing 28s. 6d., it has one large-area element loaded at 1,500 W. A 600-W circular hot plate is sold at 12s. 6d.

Similar to the last-mentioned breakfast cooker is the "Heatrae" unit produced by Electric Fires, Ltd., and sold at 30s. It is loaded at 1,250 W. A boiler-griller, measuring 8 in. by 16½ in. by 12 in., is loaded at 2 kW, and costs 47s. 6d. An 8-in. circular boiling ring loaded at 1,320 W costs 42s. (open element), and a 7-in. 1,000-W three-heat ring is listed at 36s. A hot plate, 9 in. by 8 in. (1,000 W), costs 52s., without control switches. Five warming plates are available from 10 in. by 8 in. (100 W) to 36 in. by 12 in. (500 W) at from 32s. to 115s., aluminium.

Another dual-purpose appliance is the "Manifold" produced by Premier Electric Heaters, Ltd. Loaded at 600 W, it has an "active" area of 6 in. by 7 in. and costs 25s. The Premier boiling plate is listed at 25s. and is loaded at 1,500 W; it is 8 in. in diameter, the open top being nearly wholly served by the element. A round 120-W warming plate costs £1 12s. 6d., while a rectangular one 10 in. by 15 in. (180 W) is priced at £4 7s. 6d. It is attractively finished and provided with handles.

A 9-in. "Xcel" circular boiling ring is available with a 1,000- or 1,500-W "open" element and a single heat for £1. A nickelled warming plate measuring 16 in. by 10 in. (250 W) costs £5.

Geo. Bray & Co., Ltd., have a number of "Chromalox" boiling plates from B.H.I., 5⅞ in. dia., 600 W, 21s., to B.H. 50, 11 in. square, 1,750 W, 63s.

The Edison Swan Electric Co., Ltd., markets a circular boiling ring with 1,000-W heating (three-heat) at £1 14s. A table boiling unit with a 6¼-in., 1,200-W boiling plate is sold at £2 10s., and plate-warmers from 15 in. by 10 in. by 4⅜ in. to 36 in. by 12 in. by 4⅜ in. cost from £2 15s. (100 W) to £7 5s. (500 W).

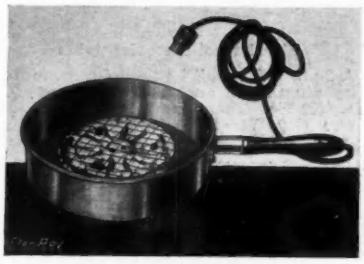
Five cooking-pot stands with 1, 2, 3, 4, and 5 sockets contain the utensil-socket feature referred to in connection with "Highlow" cookers; they are sold at from £1 15s. to £5 5s. Other products of this concern are the No. 51 boiling plate, 6½ in. dia., 750 W, 12s.; the No. 40 warming plate, 14½ in. by 9 in. by 4 in., 150 W, 40s.; and a bakeplate, 15 in. by 12 in. by

The Siemens-Schuckert cylindrical oven

6 in., with a loading of 1,500 W, at £4.

The "Hi-Speed" boiling unit manufactured by the Hotpoint Electric Appliance Co., Ltd., is loaded at 1,850 W, measures 14 in. by 9 in. by 5 in., and weighs 22 lb.; price £3 10s.

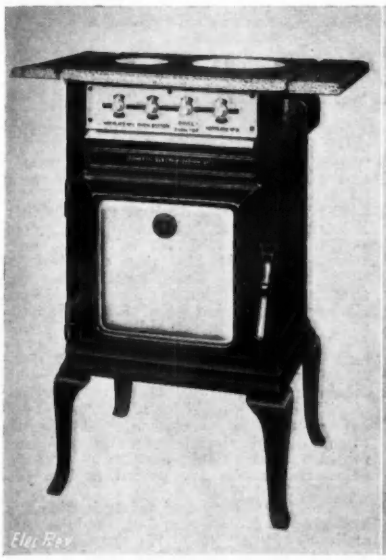
The "Stokes" table cooker, loaded at 500 W (plate warming, toasting, grilling, kettle and coffee-pot heating and bed warming) can be purchased from the London Aluminium Co., Ltd., at 27s. 6d.—lid 3s. 6d. extra. A roasting oven mar-



The "Stokes" table cooker

keted by Siemens-Schuckert (Great Britain), Ltd., has a circular oven of 285 mm. diameter, loaded at 660 W, surmounted by a rectangular hot cupboard. The overall depth is 430 mm.

The Cooper-Stewart Engineering Co., Ltd., produces a radiator-cooker, the 600-W bowl fire of which can be used for cooking operations with special utensils.



A "Dolphin" model

Complete with kettle it costs 30s. (other utensils are available); a nickel-plated 550-W boiling ring costs 10s.

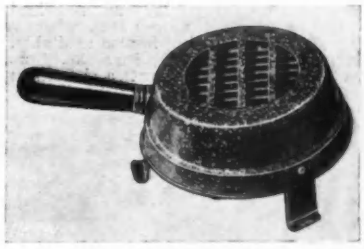
L. G. Hawkins and Co. supply a nickel-plated plate warmer with ebonised handles and fibre feet, 20⅜ in. by 8½ in., 80 W, at £4 17s. 6d.; a 6-in. dia. open table stove at 17s. 6d.; a three-heat table cooker

A Berkeley & Young toaster

for £3 3s. 6d., complete with pans, egg-poacher, &c. (650 W); a combination milk heater, complete with feeding bottle, 420 W, £2 5s.; and a 660-W waffle cooker with an automatic heat indicator, £2 5s.

The "Trojan" table cooking set consists of a 500-W "closed" boiling unit, a brass nickel-plated kettle and saucepan, and an aluminium frying pan. It costs 39s. 6d. complete.

The Revo breakfast cooker is priced at £4 10s. and has a 1,200-W boiling plate, an 800-W griller, 9 in. by 6½ in., and a hot cupboard heated by the grill. The overall dimensions are 18 in. by 11 in. by 10½ in. For 36s. a small grill boiler (1,200 W) can be obtained with overall dimensions of 11½ in. by 8½ in. by 6 in. The Revo



Rowland's boiling ring

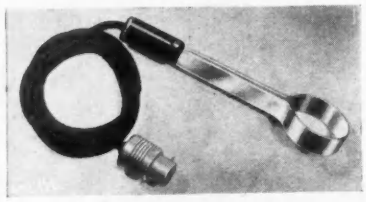
750-W open-type hot plate, costing 18s. 6d., measures 8 in. by 8 in.

A 6-in. diameter n.p. hot-plate marketed by the G.E.C. at 24s. is loaded at 500 W,

The "Tricity Combination" cooker

while a 150-W warming plate of the same make, 12 in. by 8 in., costs £3. At 9s. 6d. a 600-W boiling ring in vitreous enamel is sold by Messrs. Rowland's Electrical Accessories, Ltd. Messrs. Girlings, Ltd., sell a small rectangular 700-W plate in sheet metal and cast iron at 10s. There is a 5-in. diameter plate, 500 W, available from the Dowsing Radiant Heat Co., Ltd., at 37s. 6d.

A recent introduction by Messrs. Berkeley & Young, Ltd., the "Nippy" (12s. 6d.), is designed for grilling, boiling, toasting, baking, and for use as a fire. It is loaded at 650 W, and is of the



A "Gee-Gee" immersion heater

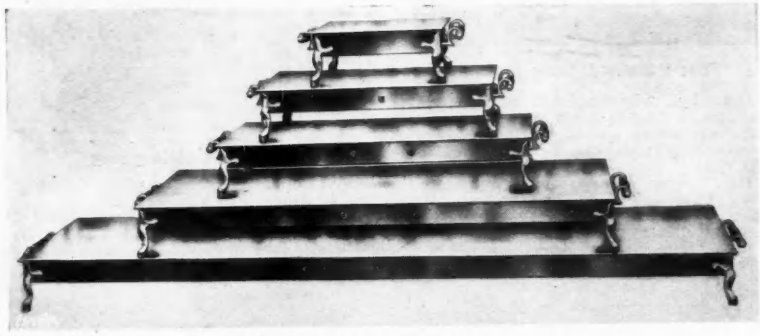
breakfast cooker type in sheet metal.

Oswald Hollman supplies an "Ultra-Rapid" boiling ring 6½ in. in diameter, single heat, 700 W, 13s. 3d., or three-heat, 225/450/900 W at 21s.

A "Swan" aluminium cooker with immersion heaters in the bottom pan for steam cooking purposes is available in three or four pieces with two elements (700/400) at from 51s. 6d. A "Trojan" model of similar construction is available in light-gauge aluminium, three and four piece sets and 8 in. and 9 in. sizes with one or two 700-W elements each. With one element the 8in. three-piece model costs 31s. 6d.

The "Edac" (Electric Domestic Appliances Co.) "Maisonette" boiler-griller is fitted with a 1,200-W enclosed hot-plate and controlled by a three-heat single switch; it measures 11 in. by 12¾ in. by 9¾ in., weighs 9¾ lb., and is priced at £1 10s. The breakfast cooker has a two-heat switch (800/1,500 W), and measures 17½ in. by 13 in. by 8¼ in., weighing 17½ lb. and priced at 41s. in vitreous enamel. The "Edac" boiling plate, loaded at 800 W and weighing 3 lb. 6 oz., is priced at 15s. in polished aluminium, while a 12s., 600-W boiling ring is also available.

The "Peter Pan" Utilities Co., Ltd., has recently brought out a breakfast cooker at 30s. It is of robust construc-



A bank of Heatrae warming plates

tion and is easily carried about for use as a heater.

The heater-cooker marketed by Homefyre, Ltd., can be used as a kettle or saucepan heater when horizontal; or it can be tilted to form a bowl fire. Girlings, Ltd., market hot plates, from B, ¾ kW, 10s. to BA, 2 kW, at 42s. 6d.

Kettles

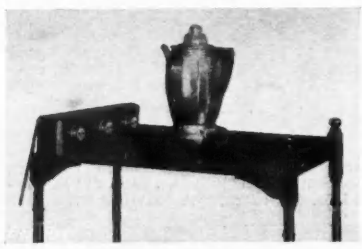
All sorts, shapes and sizes probably applies to kettles more than to most electrical domestic appliances. They are available in capacities of 1½ pints to 8 pints at prices from 15s. to 90s. The "Creda" eight-pint kettle (1,300 W) is priced at 65s. 6d. (copper). This is one of six in the "Economy" series, ranging from 2 pints (650 W) at 21s. (copper). The Creda "Utility," 2 pints, 650 W, costs (copper) 19s. 6d., without a protective device. The "Afternoon Tea" kettle (2½ pints) at 42s. is of a distinctive shape.

There is an attractive "Ediswan" silver-plated automatic safety kettle (2½ pt., 700 W), priced at £4 10s. The self-regulating automatic safety kettle 3 pt., 1,050 W, costs £2 12s. 6d. (chromium plated). A 4-pt. vessel (1,050 W) with ordinary automatic protection, is obtainable in nickel plate for £2 2s. 6d.

The 6-pt. "Premier" kettle (accident proof) in n.p. on copper is the largest of a range of five utensils. Loaded at from 500 to 1,350 W, they cost from 27s. 6d. to 65s. n.p. "Quick Set" kettles from 2 to 6 pt., and 60 to 1,350 W, cost from 32s. 6d. to 67s. 6d., n.p. Ordinary kettles from 1½ to 6 pt. and 500 to 1,350 W are priced at from 25s. to 60s.

The "Heatrae" 600-W 2-pt. kettle costs 22s. 6d., polished copper, and at 52s. 6d. a 6-pt. 1,200-W whistling kettle is available. There is a "Manor" 3½-pt., 1,000-W kettle (copper) at £1 12s., and a 6-pt. appliance, 1,500 W (n.p.) at £3 2s. 6d. "Swan" (Bulpitt) aluminium kettles can be purchased in 2 to 6-pt. models (700 to 1,800 W) at from 18s. 6d. to 26s., non-safety; 19s. 6d. to 27s., ordinary safety; and from 22s. to 29s. 6d., automatic safety.

Cooper-Stewart products include a n.p. 2-pt. vessel (550 W), for use as a kettle, teapot, or hot-water jug, at 19s. 6d., a 5-pt. aluminium kettle (1,000 W) at 40s., and a 3-pt., 700-W kettle with heat-resisting feet at 22s. 6d. (n.p.). "Trojan" utensils include a 2-pt. (500-W) "Colonial" pattern costing 23s. (n.p.). The "New Trojan," 2-pt. (750 W), costs 23s. 6d. (n.p.). An unusual teapot shape, 2-pt. kettle (500 W) is listed at 20s. "Philalurex" kettles (shallow or deep) from 2 pints (650 W) cost from 18s. non-safety, and from 21s. 6d. automatic safety (all aluminium).

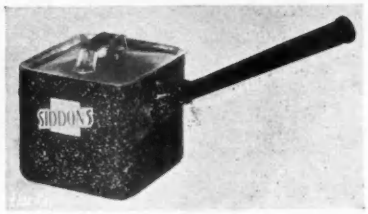


The Reyrolle service table

A 2-pt., "Efesca" kettle, with an ordinary aluminium automatic device costs 15s. (600 W). There is a "Dolphin" 3-pt. kettle (950 W) at 48s. 6d. (n.p.). The Carron "De Luxe" safety kettle costs 31s., 2 pt., 750 W, n.p. The "Hotpoint" 2-pt. automatic kettle at 36s. 6d., polished copper, is loaded at 750 W. "Magnet" automatic, n.p., 2-pt., 650-W and non-automatic 3-pt. kettles cost 29s. 6d. and 30s., respectively; 6-pt., 1,500-W non-automatic and automatic kettles cost £2 18s. and £3 2s., n.p.; a heavy-gauge copper, 3-pt., 1,500-W kettle costs £2 18s., n.p. British Electric Domestic Appliances, Ltd., offer a 2½-pt. kettle (850 W) at £1 2s. 6d., aluminium. At 21s. one can buy a 2-pt. attractive Revo kettle, or an automatic 2-pt. kettle for 27s. (3-pt. 35s. 6d.). Styled No. 976 is a 1¾-pt., 420-W "Universal" kettle, sold at £2 10s. 6d., while another Hawkins article is the "Supreme" 3-pt. (950-250-W) kettle in solid copper with a porcelain interior, priced 42s. 6d. A "Diamond" (London Aluminium Co.) 3-pt. kettle with a one-piece body costs 25s. 6d., and similar utensils in aluminium with black and ruby handle grips and knobs are priced at 23s. 6d. and 26s. (750 W).

"Xcel" ordinary and safety kettles are available in 2¼-, 3¼-, and 6-pt. models. An ordinary 2¼-pt. (650 W) model costs 26s. 6d., and a safety 6-pt. model (1,250 W), 58s. 6d., n.p. The double automatic "Tricity" safety, 1.000 W, holds 3½ pints and costs £1 19s. 6d., while an ordinary 6-pt., 1,200-W appliance is priced 47s. 6d. polished copper. There is also a "Tricity" automatic tilting kettle priced at 31s. 6d. for the 2-pt., 750-W model, and 39s. 6d. for the 3-pt., 1,000-W model in copper finish. A 2-pt. "Dowsing" copper kettle, 2 pints (750 W) can be obtained for 45s.

The "Edac" non-automatic 2-pint



A cast-iron "special utensil"

model, 650 W, costs 21s., and the 3-pint, 975-W kettle costs 27s., polished copper.

Toasters

There seems to be no limit to the ingenuity of manufacturers in the production of new designs of toasters, with automatic "turnover" devices, multi-slice and double-side toasting, etc., and models are available at all prices up to two guineas.

The "Governor" 550-W model with c.i. top and base (nickel-plated) costs only 12s. 6d., while the "O.V.B." toaster of the same make has a dark oak base, is loaded at 500 W, and is listed at 21s.

Revo, "Xcel" and "Premier" models all have loadings of 450 W. The first mentioned is sold at 15s., n.p.; the second, with similar finish and a toast rack, is listed at 27s. (22s. 6d. without a rack); and the last costs 19s. 6d. nickel and 23s. 6d. chromium plated. Other "Premier" models are No. 901, with a carrying handle (35s.), and No. 903 without a handle (30s.), both n.p.—chromium extra.

The "Regal" (n.p., 23s.) and "Triumph" (Electric Domestic Appliance Co.), are loaded at 500 W. The latter in nickel finish costs 13s. 6d. At 550 W there are the "Universal" model supplied with a push-button cord switch, and the "Ediswan" appliance at 20s., n.p. The "Ediswan Turnover" is loaded at 600 W and supplied at 25s., n.p., and 27s. 6d. chromium.

The "Efesca" 500-W model costs 21s., n.p. The "Homefyre" chromium-plated toaster, loaded at 550 W, costs 12s. 6d.

Toasting with rising heat is the feature stressed for the "Sunbeam" toaster (Cooper-Stewart). It has a special turnover device and a reflector tray, and is loaded at 600 W; it costs 30s.

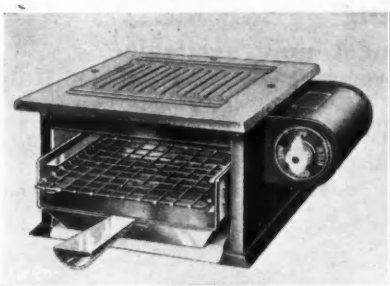
Two "Hotpoint" toasters, "Peerless" and "Toast-over," are priced 20s. and 35s., both n.p. "Magnet" appliances include a n.p. toaster, 600 W, at 21s., and a reversible model of the same loading at 600 W.

The "Golden Brown" toaster sold by Berkeley & Young, Ltd., at 15s. 6d., has a flat top for plate warming and is n.p. "Toastit" (H. G. Moseley & Co., Ltd.), a 600-W n.p. model, costs 18s. 6d. A Dowsing product is the "Rapid Toaster," 550 W, 20s. There are two "Tricity" models, No. 656, automatically reversing, loaded at 450, and priced at 25s., and No. 555, single action, priced at 17s. 6d., with a loading of 400 W.

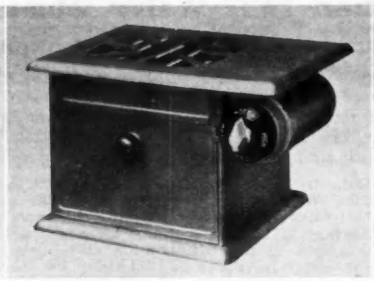
Coffee Percolators and Saucepans

Electric coffee percolators are available in capacities from a few cups to a few pints, with loadings of from 250 to 550 W, averaging between 30s. and 40s. in price.

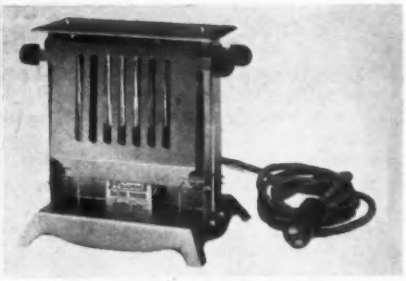
An "Ediswan" kettle



The " Manor " light cooking outfit



The Walker breakfast cooker



The Edac " Triumph " toaster

The " Milborne " percolator (" Efesca ") holds 3½ pints, is loaded at 400 W, and costs 55s.; complete with cream jug, sugar basin and tray it can be purchased for 95s., n.p. " Governor " models are available as follows: 5-cup, 350 W, 42s., n.p.; 6-cup, aluminium, 24s. 6d.; 8-cup, aluminium, nickel and chromium plated, 26s. 6d., 40s., and 47s., respectively.

There are two " Swan " models, both loaded at 250 W: No. 550, 6-cup aluminium, 8-cup aluminium, nickel and chromium plated, at 24s. 6d., 26s. 6d., 40s. and 47s.; No. 450, 6- and 8-cup, both aluminium, 24s. 6d. and 26s. 6d. A 1½-pt. n.p. (Stewart) percolator is sold at 25s. (550 W). Three models of the " Diamond " percolator are available, each in 2 and 3 pt. No. 98P has a crystal glass top and a black moulded handle, and costs 26s. 6d. (2-pt.) and 29s. 6d. (3-pt.). Nos. 98 (black handle) and 98R (ruby handle) have " Pyrex " glass tops and cost: 2-pt. (375 W) 24s. 6d. and 26s., and 3-pt. (450 W) 27s. 6d. and 29s. A range of " Magnet " appliances includes a 1½-pt. polished aluminium model, 300 W, at 48s.

Among a wide variety of utensils of the saucepan type to which our attention is directed are the following: A " Swan " double saucepan or porringer, 2-pt. (225 W), costs 18s. (steel fittings). A three-unit egg steamer of the same make costs 19s. " Trojan " electric saucepans are available in from ½-pt. capacities at from 12s.

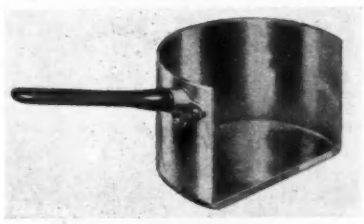
An " Xcel " milk warmer or egg boiler is available in polished copper, 6 in. high, for 30s., 300 W. A 280-W one-pint universal-voltage Premier saucepan is listed at £2 5s. Liquid food heaters and egg boilers for three eggs (1 pt., 320 W) cost 32s. 6d. For 19s. one can buy a 1-pt. (350 W) " Efesca " water boiler. There is a " Stewart " hot-water jug, 2-pt. (550 W) at 17s. 6d.

A development of the water-heater industry which more correctly belongs to the cooking field is the small separate immersion heater. At 7s. 6d., George Green & Co. produce one loaded at 500 W. It is of the loop blade construction and is coated with silver. Loaded at 400 W and available at the same price, the " Stewart " heater is of coil construction, highly plated. Another loop blade model is the " Swan," loaded at 250 W and priced 6s. 6d.; it can also be purchased with a push-button switch in the flexible for 9s. A " Governor " cylindrical model with an ebonite handle is priced 9s. 6d., while for £1 2s. 6d. one can buy a 300-W device from L. G. Hawkins and Co., Ltd.

Among the saucepans sold by the G.E.C. is one for milk with a china container. It costs 50s., holds 1 pint, and is loaded at 500 W. A 3½-pt. polished-copper saucepan, 600 W, sells at 45s., and a ½-pt., 300-W, n.p. water boiler is priced 30s.

Among a range of n.p. " Tricity " boiler saucepans there is one of 4-pints capacity, 850 W, at 30s. Another milk heater with a special container (70s., 400 W) is among those sold by the Dowsing Radiant Heat Co.

The Stewart radiator-cooker outfit

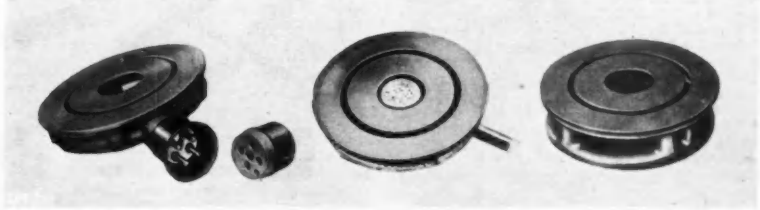


A " Pyramid " saucepan

Special Utensils

The " Highlow " cooking equipment which we have described, namely, that with sockets for self-contained utensils, demands specially made utensils, and the makers have provided for this by a comprehensive range of pots, kettles, frying pans and steamers. Examples are a 2-pt., 500-W, pot of 5-in. diameter at 32s. 6d., and a frying pan of 10-in. diameter, 1,000 W, at 60s.

Plug-in self-contained utensils necessitate special provision for their connection, and an excellent example of how this can be met is the service table produced by A. Reyrolle & Co., Ltd. The top tray carries at one end three 5-A sockets for the utensils.



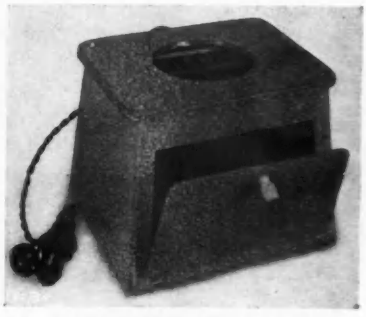
Some " Chromalox " boiling plates

Recent advocacy from all sections of the industry for specially designed utensils for use with the general type of hot-plate on modern cookers demands that such utensils shall be classified as electric cooking equipment. These utensils have thick non-buckling machined bottoms, to make a true fit on the hot-plate, thus avoiding the waste of heat which accompanies ill-fitting saucepans, &c.

Hague & McKenzie, Ltd., have a very wide range of " Pyramid " utensils of this kind. Examples of the prices are a 6½-in. diameter, 3½-pt. stewpan at 9s. 6d.; a 7-in. diameter hotpot, 5-pt., at 10s. 9d.; an 8¾-in. diameter 9-pt. steamer, 9s. 9d.; a 4¾-in. diameter lipped saucepan, 1½ pints, 7s.; and a 7-in. diameter solid-drawn seamless kettle, 4-pt., 15s. The " Economy " steam cooker is available, with one, two, and three steamers at from 20s. 6d. for 5-pt. models. It is specially constructed with communication between the tiers and valve control.

A similar range of " Swan " utensils includes a 4-pt. kettle at 12s., a 6-pt. stewpan at 11s. 9d., a four-piece, 8-in. diameter steamer at 27s., and a 10-in. base frying pan at 14s. " Diamond " special utensils are also available in a wide variety, including a four-pint saucepan at 12s., a 2-pt. porringer at 16s., a 7-in. base frying pan at 10s. 6d., and a 4-pt. kettle at 18s. 6d.

Efesca breakfast equipment



The " Peter Pan " breakfast cooker

Messrs. J. J. Siddons & Co., Ltd., have developed a range of cast-iron utensils with bottoms specially prepared for perfect hot-plate contact, &c. The range includes a 2-pt. saucepan at 4s. 1d., a 3-pt. kettle at 6s. 11d., a square 5-pt. saucepan at 5s. 11d., a square 8-in. frying pan at 6s. 4d., and a square 5¼-pt. kettle at 8s. 5d.

Section IV.—Water Heating

A review of the high- and low-loading equipment now available

In this section we adopt our own method of classification merely to avoid confusion which might arise from the use of many and varied terms. In the free-outlet type the hot-water supply is controlled by a valve in the cold-water side; in the closed-outlet pattern taps on the hot-water side are necessitated by the tank serving more than one point; the cistern-type has some form of ball-valve control of the incoming cold water contained within the equipment itself. Practically all the equipment available is complete with automatic temperature-regulating apparatus

IN classifying some of the equipment it has been necessary to assume the class to which it belongs. Unless it is stated otherwise the various models are in cylindrical form.

Free-outlet Equipment

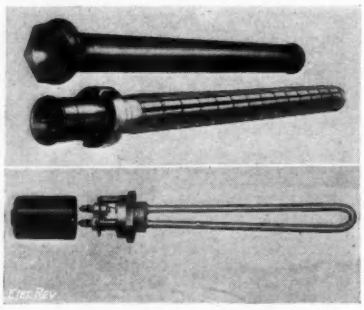
In capacities of 3, 5, 12, 20 and 30 gallons, loaded at ½, ½, 1, 2 and 3 kW, storage cylinders styled non-pressure and pressure types produced by A. Reyrolle and Co., Ltd., are sold at £9 7s. 6d..

"P.S.A." water heater (Geo. Nobbs)

£11 5s., £16 10s., £22 10s., and £32 10s., respectively.

The "Efesca" water heater, by Falk, Stadelmann & Co., Ltd., is sold in 6, 12, 15, 20 and 30-gal. sizes, loaded at 150, 250, 250, 400 and 500 W, constant, and 1,000, 1,500, 1,500, 1,500 and 1,500, boost, or alternatively, 1,000, 2,000, 2,000, 3,000 and 3,000 three-heat, at £11 3s., £12 18s., £14 5s., £17 13s. 6d., and £21 4s., respectively.

The "RTA Heatrae" (Electric Fires, Ltd.), for feeding from a ball-valve cistern, is available in from 3- (750 W) to 33- (2,000 W) gal. models at prices from £3 to £24 15s. "RTB Heatrae," for cold-water main feeding, is supplied in the same capacities and loadings, but with all



Reyrolle and Hotpoint immersion heaters

the prices advanced 10s. A quick service heater for hand control is type BH, 12 in. dia., 42 in. long, loaded at 3 or 4 kW, and sold at £8 5s. Small models for sink use are type "N.R.D."; the 1½-gal. size (500 W) costs £5 18s., and the "Heatrae" "flat-three" (rectangular), 3-gal., 750 W, costs £10 5s.

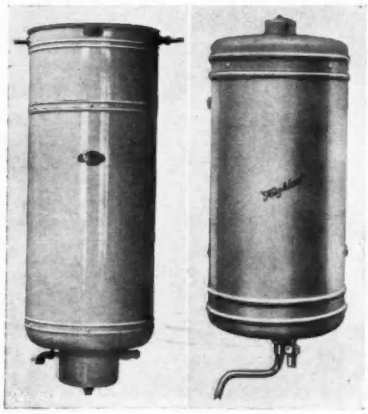
The Manor Electric Oven & Fire Co. produces 6½, 11 and 17-gal. models, the first being loaded at 500 W and costing £13 5s. A non-automatic unlagged model, loaded at 3,000 W, can be used as other than "free outlet." (Price £8 8s.). One of the "Highlow" (Archibald Low and Sons, Ltd.) tanks, 1½ gal., 500 W, is sold at £5 13s. 6d. (a.c. only). Larger tanks are available in seven sizes of from 5 to 30 gal. (500 to 2,000 W) at from £11 10s. At £9 15s. there is a 5-gal. "Dolphin" (Domestic Electrification, Ltd.), loaded at 500 W.

"Xcel" storage tanks, supplied by Siemens Electric Lamps & Supplies, Ltd., in 1½ to 20-gal. capacities (600 to 2,000 W) are adjustable for use with a ball-valve feed system, or for direct connection to the water main by slight alterations to the connections and pipes, the latter having a funnel filler for delivery. They cost from £6 5s. or £6 17s. 6d. (a.c. or d.c.) to £18 17s. 6d., according to size.

The General Electric Co., Ltd., has three models of 1½, 5, 12 gal. (500, 500 and 1,000 W) at from £6, with copper interiors. There are five models in the range produced by Ferranti, Ltd., 2 to 25 gal., 450 to 1,500 W. The three smallest types are available with vertical elements at from £6 10s., and the three large models, with horizontal elements, sell at from £14 10s.

The "Canvary" heater, produced by Berry's Electric, Ltd., in which there is special provision for varying the outlet temperature from scalding to cold, is available in from ½ to 20-gal. models, from 500 to 2,000 W, at from £7, wall-type. The four smaller models are also available without the mixing valve ("Non Canvary") at from £6 4s., while the three larger models are supplied for floor mounting ("Canvary") at from £21 5s.

White Tile Heaters, Ltd., produce rectangular models of up to 200-gal. capacity, and to overcome the difficulty of



"Aidas" and "Highlow" equipments

finding the line between domestic and other models we might take the range marketed by the Edison Swan Electric Co., Ltd., namely, 2½ to 20 gal., 500 to 2,000 W, at from £8 15s.

Credenda Conduits Co., Ltd., produce at from £5 11s., 1½ to 50-gal. models with from 500 to 3,000-W loadings. Bastian and Allen, Ltd., have two small models, 1½ and 2 gal., each with 500-W loading. The smaller model costs £6. Ordinary wall-type "Cumulus" heaters (Nathan and Allen, Ltd.), are available in from 1½ to 33-gal. models, with loadings up to 2,000 W. The last four sizes are available as wall-type models with legs. In from 1½-gal. (500-W) to 30-gal. (2,500-W) sizes, the Jackson Electric Stove Co., Ltd., produces heaters at up to £23.

The "Angelus Instanter," produced by

An "Efesca" water heater and a "Tricity" immerser

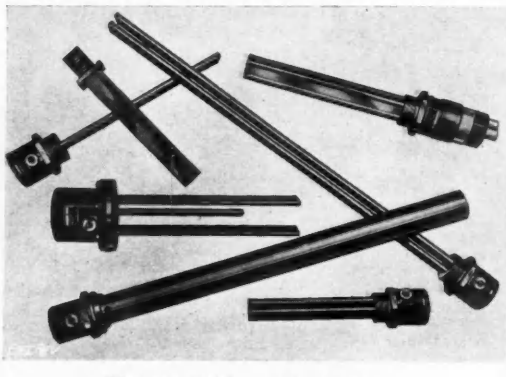
Charles Joyner & Co., is available in a 1½-gal. model (750 W) at 90s. (aluminium) and an 11-gal. model, 2½ kW, at 148s. Santon, Ltd., produce 1½ to 30-gal. tanks (500 to 2,500 W), at from £4 17s. 6d. George Nobbs, Ltd., manufacture the "Genii-Vectis" apparatus in from 6 to 30-gal. models, with from 150 to 500, and from 1,000 to 1,500-W constant and booster heats, with alternative three-heat loadings, at from £12 10s. to £24. This heater is funnel fed.

There is a small hand-basin tank loaded at 2 kW and sold at £8 15s., by the Hotpoint Electric Appliance Co., Ltd. The "Unity" water heaters (Barker, Young and Co., Ltd.), are available in from 2 to 24-gal. sizes, with loadings of from 500 to 1,000 W, priced at from £6 10s. to £24, respectively.

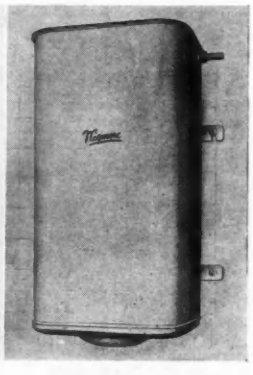
Electroway Heaters, Ltd., are responsible for a range of circular heaters with capacities of from 1½ to 20 gal., priced at from £5 7s. 6d. to £19 10s., and fitted with elements loaded at from ½ kW to 2 kW, respectively. Rectangular 1½ and 3-gal., ½-kW models, are also sold at £6 and £8 5s.

The "Wigmore" (Benham & Sons, Ltd.), lagged storage heaters, have copper interiors. Type A (5 to 20 gal., ½ to 2 kW, at £9 10s. to £16), can be connected up as open controlled outlet or broken-feed types. Aidas Electric, Ltd., make a 2-gal. 500-W model for £6. The larger closed-outlet types can also be used as open-outlet models. The "Inventum" water heater (R. A. Wood), No. 454 (1½ gal.), costs £4 7s. 6d.

The "Condensacone" water heater (Alan Wright, Ltd.) is available in 1½ gal. capacity at £6, with a 500-W "Chromalox" element. It is equipped with a special distilling device to eliminate scaling troubles.



"Chromalox" immersion heaters



A Benham tank

Closed-outlet Tanks

The "Genii N.S.G." calorifier is available in sizes from 13 in. dia. by 26 in. high (500 or 750 W) to 23 in. dia. by 64 in. high (2,000 to 3,000 W). The smallest model costs £12 10s. and the largest £37. "Highlow" tanks are made in capacities of up to 100 gal. A 30-gal. model costs £11 10s. Others fitted with side-entry circulators cost from £11 2s. (15 gal., 1 kW).

The "Xcel" tanks already referred to

"Manor" and "Arora" water heaters

are rendered available as "pressure" units by modifications in the connections, &c., at the same prices. There are 15-, 20- and 30-gal. (1,000, 1,000 and 2,000 W) "Magnet" tanks available at up to £18, with steel interiors.

An 11-gal. (900-W) Ferranti unit, for wall mounting, costs £12. Other models range up to 25 gal. (1,500 W) in size and £23 10s. in price (floor or wall mounting), while of the floor-mounting units the 30-gal. model (2,000 W) costs £31 10s. Eleven "Bastian" models of from 5- to 42-gal. capacities (500 to 3,000 W), cost from £9 0s. 6d. to £32 5s.

For £11 5s. and £21 17s. 6d. one can buy 12- and 30-gal. (1,000 and 2,500 W) wall-mounting "Santon" tanks. Of the floor-mounting tanks the 30-gal. model (2,500 W) costs £23 12s. 6d. Berry's Electric tanks for wall fixing are available in 12-, 15- and 20-gal. sizes (1,000, 1,500 and 2,000 W) at from £13 16s.; floor-type models in from 20- to 60-gal. tanks (2,000 to 3,000 W) at up to £51, all tinned copper.

"Angelus" tanks which can be adjusted to serve as either free and closed outlet units are available in from 2- to 14-gal. models (350 to 11,000 W) at up to £18 10s. Similarly, 5- to 20-gal. tanks (750 to 2,000 W) produced by the Arora Co., at from £12, will serve for both methods.

The "Unity" (Barker, Young & Co., Ltd.) heaters, are made in 12-, 18- or 24-gal. sizes, with loadings of 500, 750 and 1,000 W; the prices are £14 10s., £18 and £24, respectively. "Electroway" heaters are also made in the closed type with the same capacities, loadings and prices as those of the open-outlet type. The "Wigmore" storage heaters, type "A," can be used as closed outlet models. The sizes and prices are: ½ to 20 gal. (500 to 2,000 W), type "A," £9 10s. to £16. Similar unlagged heaters are made for small circulating and non-circulating systems. Capacities vary from 5 to 100 gal., and prices from £6 15s. to £24. The "Sadia" heaters (Aidas Electric, Ltd.) range from 5 to 30 gal., from 500 to 2,000 W, and in price from £7 10s. to £22.

An Electroway model

Cistern Appliances

The "York" Santon unit is available in from 2- to 15-gal. sizes (1 to 3 kW) at up to £12, chromium plated, the two smaller sizes being of the displacement type only. Four "White Tile" models of from 5 to 20 gal. (750 to 2,000 W) can be purchased for up to £21. Creda heaters are available in 5-, 11- and 17-gal. models (500, 1,000 and 1,000 W) at from £11 5s. Jackson's 5-, 21-, 15-, 20-, and 30 gal. tanks (500, 1,000, 1,500, 2,000, and 2,500 W) cost up to £25.

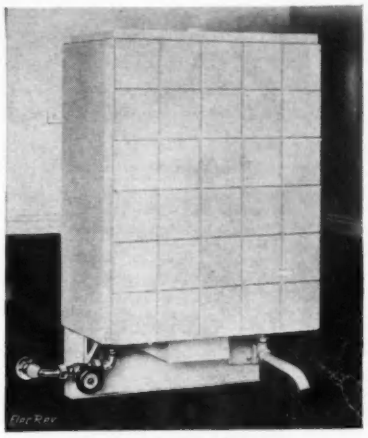
Type F.B. "Heatrae" is rectangular and available in 6-, 12-, 15-, 20-, and 30-gal. models (750 to 2,000 W) at from £12 16s. Circular heaters (R.B.) of 12 to 33 gal. (1 to 2.5 kW) cost up to £24 5s. Rectangular tanks by Berry's Electric cost from £13 10s. to £27 for from 5- to 30-gal. models (800 to 2,500 W). "Highlow" heaters are sold at from £10 15s. to £25 for from 5- to 30-gal. models (500 to 2,500 W).

Belling & Revo immersion heaters

Rectangular "Magnet" 10- and 20-gal. tanks (1,000 and 2,000 W) cost £17 10s. and £22, respectively. There are three Ferranti tanks, 11, 17 and 25 gal., loaded at 900, 1,250 and 1,500 W, and the smallest is priced at £17 5s. Santon tanks range in size from 5 to 30 gal. (500 to 2,500 W) at prices from £9 10s. to £23 15s.

The "Wigmore" "B.C." and "B.R." heaters contain their own ball-valve cisterns and are suitable for tap- or valve-controlled outlets. The capacities range from 5 to 20 gal., the loadings from ½ to 2 kW, and the prices from £12 to £20. All the "Inventum" heaters above 1½ gal. are of the cistern type; they range from 4½ to 55 gal. in capacity and from £4 7s. 6d. to £28 12s. in price.

"Condensacone" water heaters are available with capacities of 5, 12, 15, 20, 30 and 40 gallons, priced at £12, £14 15s., £17 5s., £20 and £24, respectively.



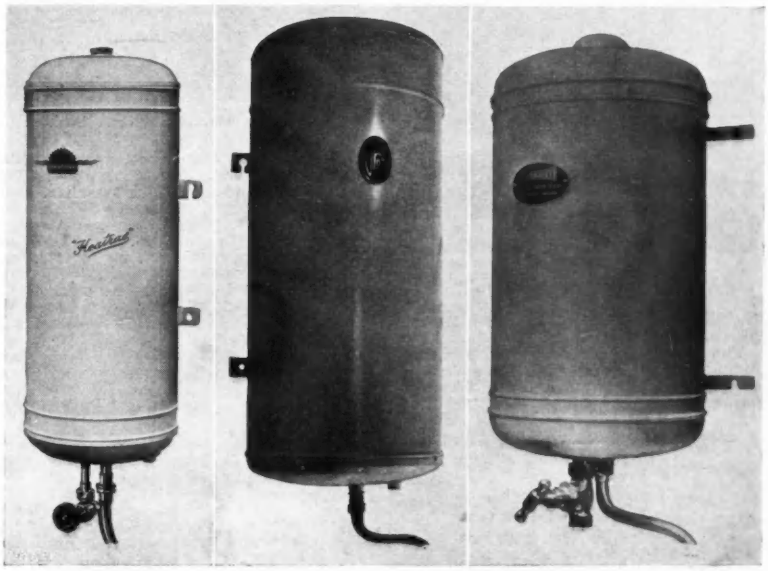
A "White Tile" tank

Immersion Heaters

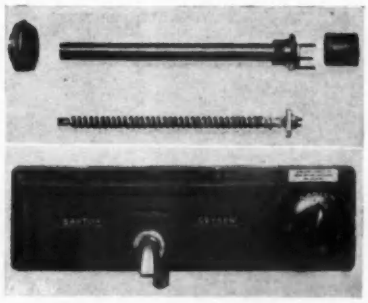
Six sizes of "Arora" tube equipment (330 to 1,500 W), 6¾ to 22½ in., long, can be purchased for from 28s. "Xcel" tubular heaters, from 250 W to 2,000 W, 6⅛ in. to 16½ in., cost from £1 6s. 6d. to £2 6s., and blade-type heaters, in similar loadings, all 10 in. long, are available at the same prices.

"Highlow" tubes, from 250 to 4,000 W, 10¼ to 30 in., cost from 20s. to 80s., while blade-type heaters (250 to 3,000 W), 4½ to 10½ in., cost up to £3 6s. External type circulators, 1,000, 2,000, and 3,000 W, 14¾ in. long overall, cost from £3 12s., and side-fixing internal circulators, embodying thermostats (1 to 3 kW), 18 to 30 in., vertical-tube, cost from £5 14s. Top-fixing circulators, with thermostats (1 to 5 kW), 18 to 36 in. long, cost from 45s.

"Magnet" tubes (500 to 2,000 W), 8½ to 19½ in., can be purchased for up to £2 10s. Tube-type heaters, with thermostat con-



Heatrae, Jackson and Ferranti tanks



Bratt & Colbram immerser (above) and a Santon geyser

The "Iota" electric urn

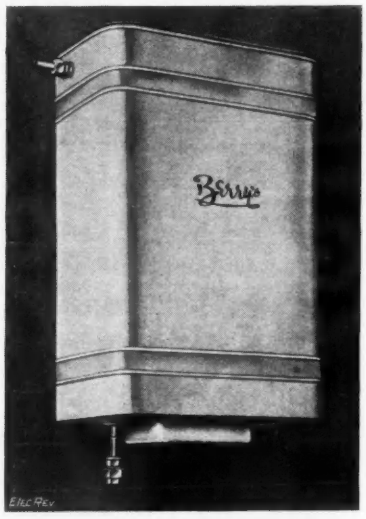
trol (1,000 to 3,000 W), 14in. to 22⅛ in., are listed up to £5 5s., and blade-type appliances (100 W to 6,000 W), 9½ to 12¾ in., from 27s. Berry's Electric tubes (1,000 to 2,000 W), 10½ to 18½ in., cost from £1 16s. to £2 14s. "Creda" blades (200 to 2,000 W), 6¼ to 19⅜ in., cost from 27s. 6d. to

A Reyrolle "installation"

47s. 6d. Tubes (1,000 to 3,000 W), 11½ in.. 30s. to 50s.

The Santon "Circ-Stat" (top fixing, including a thermostat), 1 to 3 kW, 16 to 42 in., is available at from £4. The top-fixing circulator, without thermostat, 3 kW, 16 to 42 in., costs up to £6; 4 kW, 10s. extra. Tank belts, up to 1,000 W, and 57 in. (external fixing), cost up to 30s. "Heatrae" tubes, 250 to 2,000 W, 6 in. to 20 in., cost from 25s., while blades, 750 W to 10 kW (multiple), 10 in., sell at up to 180s. Circulators without thermostats, 1 to 3 kW, 22 to 38 in., are priced at up to £5. Hotpoint loop-type heaters, 1 to 5 kW, 10 to 22 in., cost up to £2 12s. 6d., while a "Flat" unit, 2 kW, 1⅛ in., costs £3. "Efesca" tubes (500 to 3,000 W), 5⅜ to 17¾ in., are listed at up to 46s. Reyrolle units, loaded at from 750 W to 6 kW, and costing from £1 12s., have metal-clad inlet sockets. Belling heaters (250 to 3,000 W), 5⅜ to 24⅜₁₆ in., are available at up to £2 10s. "Swan" units (650 to 2.000 W), 7½ to 18⅜ in., can be bought from 25s. "Tricity" (1,000 to 3,000 W), 11⅜ in., are priced at up to £4 5s.

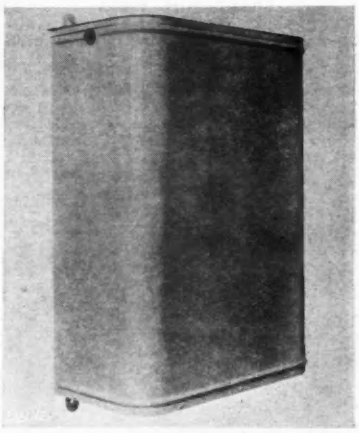
A heater for every size of tank is the information we have concerning Revo products. "Chromalox" (George Bray



Berry's electric cistern tank

and Co., Ltd.), blade-type, are available in loadings from 250 to 7,500 W, 7 to 33½ in., at up to 95s., without switches, and from 37s. 6d. with switches. Circulators, 1 kW to 4 kW, 20 and 30 in., cost up to 90s. without thermostats, and 1,000 to 3,000 W, 11 in. to 28¼ in., up to 132s. 6d. with thermostats. "Gee-Gee" (George Green & Co.) blade-type immersers (250 W to 14,000 W), 4½ to 15 in., cost from 17s. to £9 12s., and models with switches, 660 W to 2,000 W, 10⅜ in., cost from £3 10s. 6d. to £4 7s. 6d. With safety cut-outs, 1,000 to 3,000 W, 5½ to 12¾ in., they cost up to £3 7s.

"Cumulus" (Nathan & Allen) single-



Magnet cistern storage heater

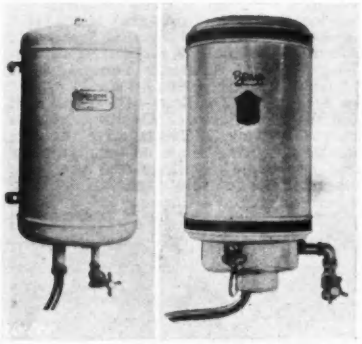
tube appliances (200 to 2,250-W, 5⅝₁₆ to 29⅜₁₆ in.), cost from £1 8s., and multiple-tube (1,505 to 3,000-W heaters, 13¹³⁄₁₆ to 25⅜ in.), cost up to £5 5s. The "Mortimer" (Bratt & Colbran) immersion heaters, available from 7 to 18 in. long, range in price from 23s. 6d. (500 W) to 30s. 6d. for the 1,250-W model.

The non-withdrawable "Wigmore" heaters are produced in nine models, from 600 W to 4,000 W, priced at from 32s. 6d. to £4; there is an 8-kW, 12-in. model at £9. The withdrawable type (horizontal) (750 W to 3,000 W, 10 in. to 22¾ in. long), costs from £2 to £3. A special flame-proof, non-withdrawable type is also available. Electroway Heaters, Ltd., manufacture a range of immersion heaters.

Geysers and Special Heaters

The Santon geyser is made in six types, with 1, 2, and 3 elements, and with loadings of up to 6 kW per phase. A 3-phase unit is available at £9 9s., measuring 21 by 6 by 6 in. The smallest unit (single element) is listed at £6 6s. Seven "Gee-Gee" models, with outputs from 24 to 114 gal. per hour, 100 deg. F., cost from £5 9s. 6d. A small Cooper-Stewart model for direct tap connection sells at 50s.

The "Genii P.S.A." water heater for wash basins, etc., is equipped with a bevelled plate-glass mirror, in 2½-gal.



"Magnet" and Berry water heaters

(750 W) and 5-gal. (1,000 W) sizes; the large model costs £14 10s. "Genii" geysers are also available in capacities of from 24 to 81 gal. per hour at 100 deg. F., with loadings of from 3 to 10 kW. The smallest (nickel-plated) costs £8 5s. The "Reymez" (Reyrolle) pedestal wash basin, with a self-contained water heater, is available in ratings of ½, 1, 2, and 3 kW. Siemens-Schuckert sell a bath-room calorifier with a shower spray, loaded at 1,500 W.

The "Heatrae" (Electric Fires, Ltd.) "Under-the-basin" automatic heater is of the open-outlet type and gives a hot-water supply to a basin through a special form of standard tap; a 3-gal., 750-W a.c. model costs £10 18s., d.c. 10s. extra. The "Inventum" "Under-the-basin" (454A) heater, fitted with a new "Mix-a-tap," enables hot, cold, or mixed water to be drawn from one tap; it costs £6 2s. 6d.; No. 454B, the "barber's cistern," costs £6 7s.

"Sadia" and "Genii" tanks and a Santon belt heater

Section V.—Vacuum Cleaners

Machines with many domestic applications

The motor-driven suction cleaner occupies a dominating position in the domestic appliance field. It is undoubtedly one of the greatest labour savers devised so far. Besides its primary function of cleaning floor coverings, which it does either simply by suction, or with the aid of revolving brushes and carpet beaters, it is capable of performing many other cleaning functions. By the addition of appropriately shaped accessory nozzles and extension hose it will clean walls, curtains, upholstery, etc., and extract dirt from furniture (or blow it out in the case of those machines which are reversible); a few are also designed to drive a floor polishing brush or pad as well

VACUUM cleaners may be classed as large, costing from ten to sixty guineas; medium, priced at four to six guineas; and a few "baby" models small enough to be held in one hand for

The "Thor"

dusting, cleaning clothes, and similar applications, priced at from £2 17s. 6d. up to about £5.

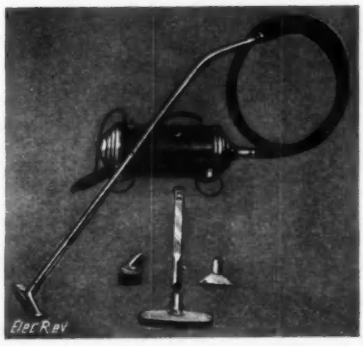
Cylindrical Machines

One large group is so designed that the driving motor, suction fan, and dust collecting bag are all contained within a cylindrical casing which rests horizontally on wheels or runners. The suction nozzle is attached to a length of hose

The "Tellus"

which also serves to pull the machine along behind the user.

A cleaner of this type is the "Mary Ann," produced by British Electric



The "Efesca"

Domestic Appliances, Ltd. This is a shock-proof machine with a 220-W motor which will operate on both d.c. and a.c. circuits. The motor is encased in "Bakelite," and has ball bearings.

Two of the "Electrolux" accessories are unusual, one of them being intended to destroy moths and the other for spraying insecticides, paint, etc. L. Benn & Co., Ltd., have succeeded in restricting the weight of their "Demon" cleaner

The "Auto-Maid"

to 7 lb. only. Its 180-W motor is universal and has ball bearings.

The Northern Steel & Hardware Co., Ltd., fits its machine with a specially built 200-W B.T.-H. motor, carefully insulated from the outer casing. Both end covers are bushed with insulating material and accessories are chromium plated. A patent suction intensifier ring results in a minimum suction on test of 28 in. w.g. This machine can also be used for blowing.

Features of the Cooper-Stewart cleaner are its impregnated casing of high-grade insulating material; a built-in insulated switch, and spring closing device for the suction cover. The dust bag is provided with double rubber packing and a double filter. The ball-bearing motor needs neither oil nor grease. Arthur Morris & Co., Ltd., insulate the motor of their cleaner (B.T.-H. 200 W) from the outer casing and the aluminium end covers are also bushed with insulating material. Their machines have a "Siroma" suction intensifier and can be reversed for blowing. In place of the usual dust bag,

The "Electrolux"

which has to be emptied periodically, replaceable paper bags (retailing at 1s. 6d. per dozen) are provided.

The "Durco" of Brown Brothers, Ltd., creates a vacuum equivalent to 12 in. w.g. with a ⅜-in. orifice. Its nozzles have rubber furniture guards. The "Auto-Maid" is light and compact. The Hornby Electrical Supplies Co., Ltd.,

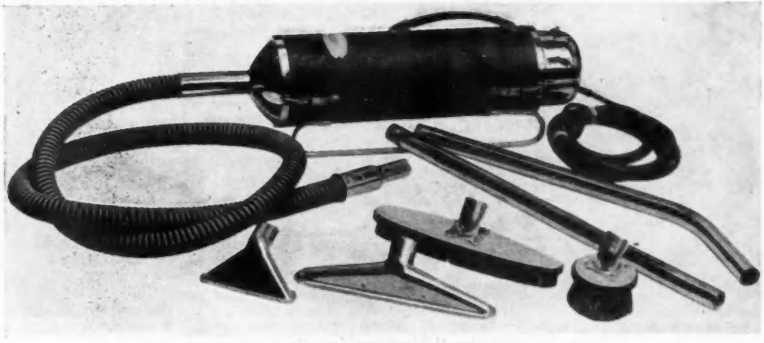
The "Eureka"

chromium plates the metal parts of its cleaner, which has a universal 200-W motor. The machine weighs 9.5 lb., and it is known as the "Hescolux."

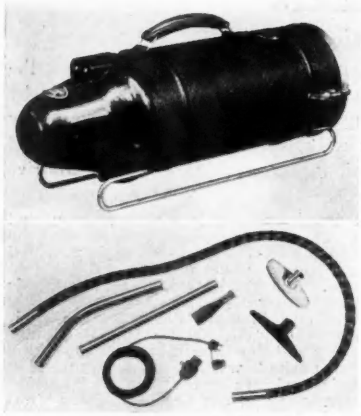
The Siemens "Xcel" has a large nozzle with a suction surface 12 in. wide. The machine is mounted on nickelled runners and can also be used as a blower. Falk, Stadelmann's "Efesca" is well made.

Upright Cleaners

The next class of machine is mounted on two or three small wheels, and has an external dust bag attached to a long handle. A switch is usually incorporated in the handle. The "Magnet" machine, which is of this pattern, has an insulated



The "Duco" cylindrical cleaner and accessories



The " Mary Ann "

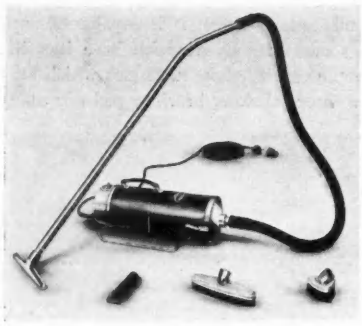
handle and an adaptor for converting it into a blower. It weighs 13½ lb. and has a 140-W motor. The Hawkins provides 17.5 in. w.g. suction on test. These cleaners and the "Vampire," made by R. G. Dixon & Co., Ltd., operate by suction alone.

The Forward "Bustler" is built on different lines. The nozzle, 125-W motor, and handle are mounted in tandem without wheels or runners, so that the weight rests on the nozzle entirely; but the machine weighs 7.5 lb. only, and it will stand up in a corner like a broom. The "Gem" cleaner has a self-starter on its motor case which switches the machine on only when the handle is moved from the vertical, and switches off again when the handle is upright.

B.T.-H. motor for the " Ediswan " cleaner

The " Pneumode "

The "Ediswan," the "Hotpoint Junior," the "Pneumode," and the "New Barker" suction cleaners are produced by the Edison Swan Electric Co., Ltd., and all of them are driven by B.T.-H. motors. The body and endshield are aluminium die cast; the impeller is made of pressed steel with blades welded in position, and ball bearings are fitted to all types packed in grease so that no further lubrication is necessary. The motor is of the series-commutator type,



The " Northern "

and is wound "universally" for both a.c. and d.c. With a rating of 200-W and a speed of 10,000 r.p.m. the suction is about 14 in. w.g. The accessory equipment of the "Hotpoint Junior" includes a soft bristle brush which picks up threads, fluff, and other matter, and

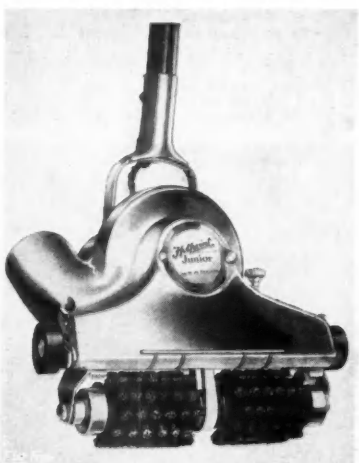
The Premier " Spic-Span "

a floor polisher can be attached easily in place of the nozzle brush.

There are three "Hotpoint Premier" models. Both the "Junior" and the "Duplex" have a motor-driven bristle brush; that of the larger machine vibrates the rug on the floor, so loosening the dirt as well as picking up threads and fluff. By using an extension hose and tufting tool in place of the dust bag the set can be used for blowing, and a floor polishing attachment is provided. The non-marring castors will not mark polished floors, and an auto-locking device keeps the handle upright when not in use. The smaller of the two models weighs 7 lb., but the "Spic-Span" is small enough to be held in one hand.

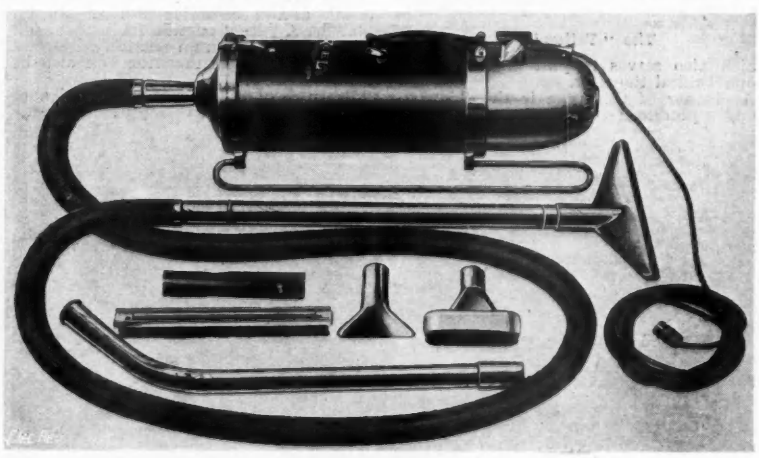
Two "Vac-Tric" cleaners are available, one cylindrical and the other upright. The British Vacuum Cleaner & Eng. Co., Ltd., makes the 160-W cylindrical "Goblin" weighing 7.5 lb., which has an agitator nozzle with a swivel coupling; and the 100-W "Wizard" with a removable handle which enables it to

The " Bustler "



The brushes of the " Hotpoint Junior "

be used with one hand, the dust bag being then strapped to the user's arm.



The " Siemens-Xcel "

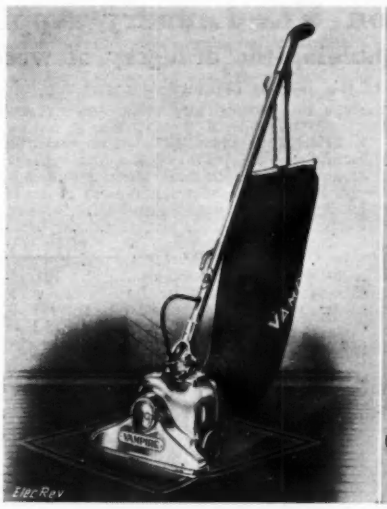
Drake & Gorham Wholesale, Ltd., are marketing, amongst others, an upright 200-W machine that weighs 17 lb., as well as the cylindrical "Busy Bee," which is 11 in. high, 19 in. long, weighs 12 lb., and has a 160-W motor. The "Thor" duster is a powerful (120-W) one-hand appliance designed for places where the larger cleaner cannot be employed, for its weight is only 4 lb. The 190-W, 12.5-lb. machine has a rubber protected brush, and a spring keeps its handle upright.

The "Hoover" was the first to combine beating, sweeping and suction cleaning in one machine. This principle consists in lifting the carpet from the floor by suction, and while it is raised subjecting it to a series of taps which loosen embedded dirt and shake it to the surface, whence it is drawn by the vacuum into the dust-bag. The beating is done by

The "Universal de Luxe"

four beater bars attached to a rotating agitator in the mouth of the machine; also attached to this agitator are two brushes which collect any clinging surface litter. The fan diameter is 5.75 in., and the 270-W motor has an auxiliary fan to keep it cool. A smaller model has a 185-W motor and a floor polisher can be attached to either. The "Minor" relies on suction alone so it is fitted with a 205-W motor; its weight is 10¼ lb. 5 oz. The 135-W "Dustette" weighs 4½ lb. The C.C.A. is another handy cleaner.

The fan case of the new British-made "Eureka" machine has been redesigned to improve suction, and the handle is



Left: The "Vampire; right: The "Hoover"

detachable for portability and to facilitate use in cramped situations. When the floor polisher is in use a handle-locking device raises the wheels of the cleaner above the floor. The accessories include a "Sanitor" for moth-proofing, disinfecting, &c. The "O.K. Whiskbroom" of Andrew Page & Son, Ltd., can be used as a hand machine or as a floor sweeper.

The "Goblin"

The single wheel runner and handle are easily detachable, and either stationary or rotary brushes can be used. Its weight is only 3 lb. and its price £2 17s. 6d.

Practically every cleaning operation can be done with an "Air-Way" machine, which has many refinements designed for convenience in use. A self-adjusting floor tool and contact equalisers provide for cleaning carpets of various nap lengths. Fibre agitators assist the action and take the friction wear instead of the rug; when worn out they can be replaced. A universal handle joint transmits the motion of the user's wrist to the floor tool.

A brush can be employed to dislodge clinging particles, the universal joint permits the tool to be inserted under furniture, the hollow handle can reach inaccessible places, and the front wheels are removable for the same

The "Vac-Trio" cylindrical type

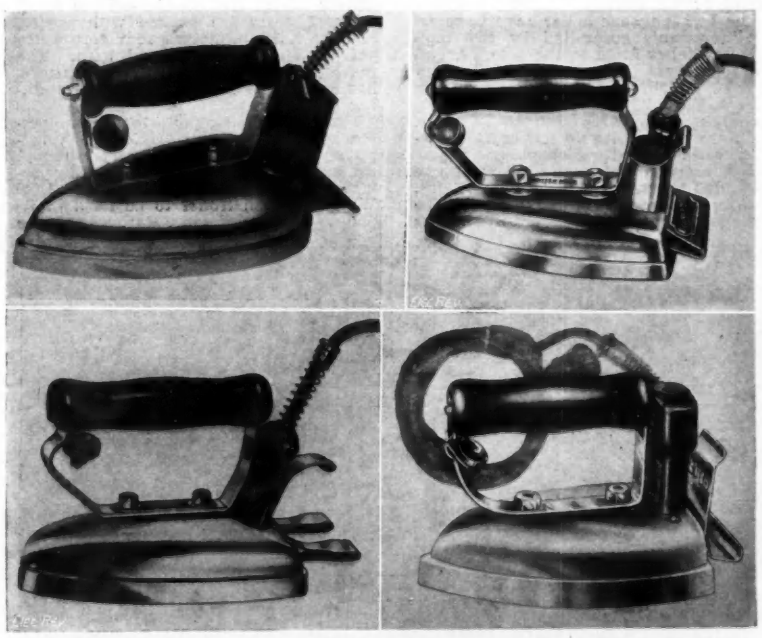
purpose. The dust stream is visible through a window, there is a floor polishing attachment, and another for applying wax to the floor.

Canister Models

The third class of cleaner may be described as the canister variety, which stands on the floor and has to be lifted by hand from place to place. Dust is sucked through a hose direct into a metal container, the air being drawn through a filter bag by the suction fan in the mouth of the canister, upward and out through the vertical driving motor which is situated above.

The "Tellus" is of this sort, but it is much more than a vacuum cleaner. For instance, it can be employed as a blower for drying hair, light laundry, or cooling a small room; while a simple adaptation will convert it into a spraying machine. There are four sizes: the smallest for household use stands 19 in. high, is 9.5 in. in diameter, and weighs 9.75 lb. Its 113.5-W motor speed is 10,000 r.p.m., and the capacity of the dust receptable 488.2 cu. in.

The "Norfolk," made by Gillespie & Beales, can be put to similar varied uses. The case is of polished aluminium and the 190-W universal a.c./d.c. motor drives a two-stage turbine fan. The fabric filter bag is kept rigid on a wire frame. The Siemens-Schuckert machine has a double filter and the 150-W motor and turbine fan fit inside it, being jacketed by the filters. It can be used for blowing and spraying also.



Four typical irons (see next page): Above, products of the British Electrical Domestic Appliances, Ltd., and John Shaw & Sons. Below: A Berkeley & Young iron and the "Ediswan"

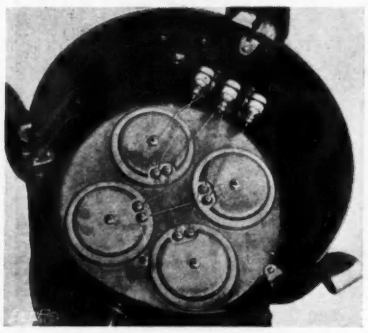
Section VI.—Laundry Appliances

Lightening the drudgery of washing

Laundry work is undoubtedly the hardest of the average housewife's many fatiguing tasks. Clothes must be washed, dried, ironed, and aired, all of which can nowadays be done better, more quickly, and far less arduously with electrical aids

ONE of the first requisites of the home laundry is hot water and facilities for boiling such clothes as need it. The "Magnet" wash boiler is very suitable for use in a small kitchen or scullery. The outer casing is galvanised or enamelled iron, and stands on three legs. The inner tinned copper container will take four or five full-size bed sheets. There is an inner zinc percolator permitting free circulation of the water. A draw-off tap is provided. The heating elements are copper sheathed strip with a loading of 500 W each. There is a three-heat switch and fuses, a pilot lamp, and a fusible-plug cut-out can be added.

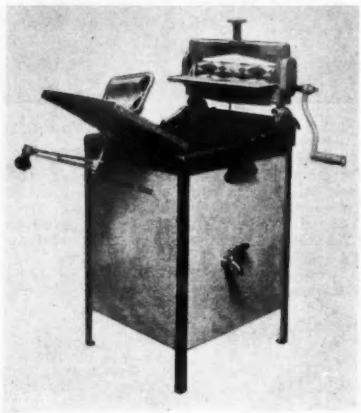
The "Servis"



"Jackson" wash-boiler elements

The inner container of the "Hotpoint" is air-lagged from the body. A three-heat switch controls a "Calrod" tinned copper tube immersion element, which can be removed easily. A movable grid fits over the sump and prevents clothes coming in contact with the heater. The "Tricity" is provided with an earthing terminal and four-core c.t.s. cable armoured with flexible steel wire.

A large range of wash boilers is made by Burnley Components, Ltd., finished in polished copper, aluminium, porcelain, enamel, and bright colours in cellulose. The "Burco" clamped heating elements are machine-wound, metal-sheathed, and fixed to the bottom with screw studs. Two types of safety cut-out are available. Loose and hinged lids are fitted with a steam condenser at the back, while one model serves both as a wash boiler and bath water heater. The "three-in-one" model has a hand-operated dolly and wringer.



The "Margery Daw" electrically heated washer

Instead of the usual round boiler, George Green & Co.'s is rectangular. The washer attachment to the lid is hand-operated, as is also the clip-on wringer. The Siemens-Schuckert wash boiler depends for its action on a central geyser pipe, through which the hot water bubbles upwards, so maintaining circulation. The container is heat-insulated.

The "Santon" boiler of John Shaw Sons, Ltd., is obtainable in galvanised or enamel finishes. It stands on three legs, and a draw-off tap and hinged lid are provided. The three-heat switch is housed in the boiler casing. The 500-W elements are fitted into six parallel tubes in a shallow sump at the bottom of the container, and can easily be inserted or withdrawn.

The Jackson wash boiler has "Chromalox" elements controlled by two foot-press switches fitted to the side. A cut-out to prevent the container boiling dry can be added, and another extra is a "Perco-Wash" sprayer. The several models made by Archibald Low & Sons, Ltd., are rustless inside and out. Three-heat wall-mounted switch plugs are provided, and an extra safety switch can be added to avoid damage if boiled dry. A copper spraying device can also be incorporated in these "Highlow" boilers if desired. Besides the normal "Manor" wash boiler, which has a wall-mounted three-heat switch and fuse panel, another model is very suitable for flats and small bungalows, since it can be arranged for heating bath water.

Both round and rectangular "Brailsford" models are available; the rectangular one occupies minimum space, and some water always remains at the bottom to cover the elements. "Creda" boilers are made in three types, with draw-off tap and cleansing nipple in each case. Element protectors can be fitted and a spraying device if required. Other makes are the "Heatrae," "Ediswan," "Efesca," &c.

The capacity of such boilers is about ten gallons, their loading 3 or 4 kW, weight 45 lb., height 30 in., and diameter 20 in.; the prices range from 4 to 8 guineas.

Washing Machines

Electric washers abolish the drudgery of rubbing and scrubbing the clothes, which are swirled vigorously in the hot soapy water by a reversing agitator driven by a small motor underneath.

Fixing the ironer to a "Thor" machine

The G.E.C. washer has a double-coated porcelain enamel tub, and the agitator motor also drives a wringer, which can be locked in six positions. There are two levers; one starts the agitator and the other the wringer, which has soft rubber rollers and a quick-release lever. Die-cast gears are packed with grease, and the 0.25 h.p. motor's reduction worm gear is enclosed in an oil bath. The machine stands on adjustable castors, has a drain cock and a three-core earthing connector.

The B.T.H. "Hotpoint" washer operates on the gyrator principle, has a one-piece cast aluminium tub, and a hinged lid. The wringer can be quickly removed for an electrically heated (1,200 W) and driven ironer to be fixed in its place. Even pressure throughout the

The "Highlow," "Manor," "Brailsford," and "Burco" wash-boilers

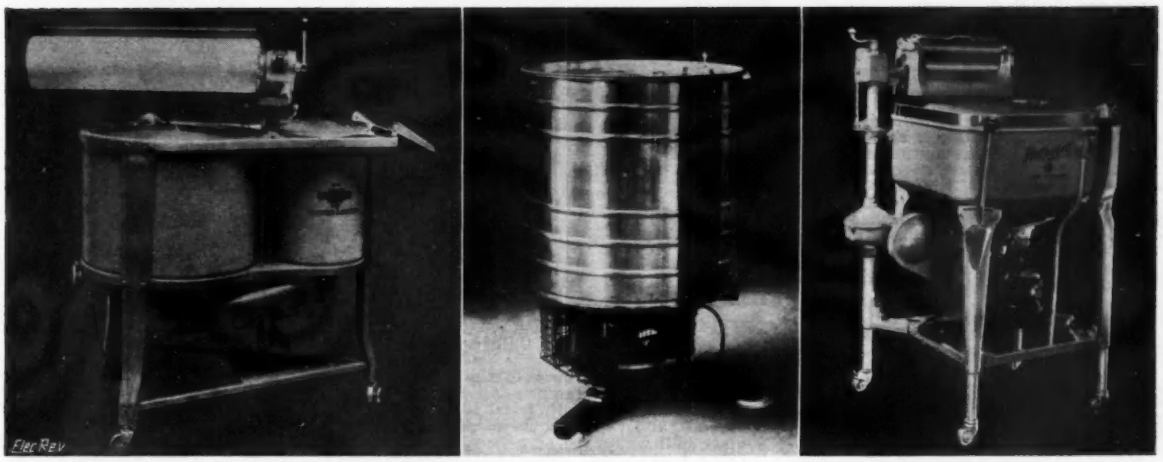
width of the wringer is obtained by the use of a hard bottom and soft top roller. The "Thor" machines of the Hurley Machine Co. are finished in delightful colours. Several sizes of tub are available with either or both wringer and ironer attachments. There is also a table model ironer with a 26 in. long roll and a loading of 1,150 W, and the wringerless washer incorporates instead a centrifugal

ported side by side. One of them contains the washing agitator and the other a centrifugal dryer. Merely moving a lever directs the soap suds back into the wash tub, or the rinse water into the drain, while a water pump has been added to drain the wash tub electrically. This company also has a separate electric ironing machine, driven by a ¼ h.p. motor, which is fitted with a porcelain

the rim of the mangle flywheel, so driving the rollers at average hand turning speed. The outfit is priced at £7 19s., but for those who prefer a geared motor-driven mangle there is a £12 10s. model.

Flat Irons

Flat irons of many makes are on the market, plain plated and enamelled in bright colours; the most popular domestic



Left: the "Universal" combined washer, wringer and dryer. Centre: The Siemens-Schuckert washer and hydro-extractor. Right: The "Hotpoint" washer and wringer

hydro-extractor. The clothes are washed by the agitator in the bottom of the tub and transferred to a perforated sheet aluminium extractor basket for drying.

The "Servis" machine (Wilkins & Mitchell) embodies simple control which enables washing and wringing to be done at the same time. The 0.25 h.p. motor drive and gears are enclosed in an oil-

The "Xcel" travelling iron

filled case and castors are not fitted, so that the machine remains still during operation. The polished aluminium and blue enamel finish is attractive. The range marketed by L. G. Hawkins & Co., Ltd., includes "Universal" washers with wringer and ironer attachments as well as a model with two separate tubs sup-

table top. The simplified "Hera" machine costs only £12, and the "Efesca" and C.C.A. have features of interest.

The "Dexter" combined washer, wringer and ironer is marketed by the Dowsing Radiant Heat Co., Ltd., and separate ironing machines as well as combined washer-wringer-ironer models are obtainable from Siemens-Schuckert (Great Britain), Ltd., whose turbo washer has a rolling action. Washing and rinsing are effected at low speed, while centrifugal drying is done at high speed in the same drum. The speed of the drum is automatically changed by gearing according to its position. The drum rotates at 25 r.p.m. when tilted; when upright its speed is about twenty times faster. This novel machine will not work unless the lid is locked in position, and its loading is 300 W.

Washing machines cost from £29 to £50 of which the ironer, if fitted, accounts for about £10.

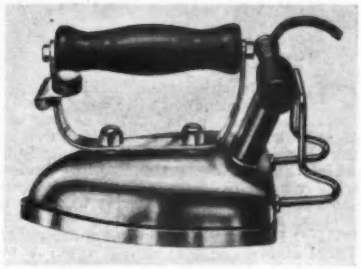
Drying and Airing

Dowsing airing and hot cabinets, wood and metal, cost from £23 upwards.

The "Joywheel" is a labour saver made by Whittaker Bros., Ltd. It consists of a 0.25-h.p. drip-proof motor mounted on a pedestal which will stand beside any ordinary mangle. Pressure on a foot pedal raises the motor slightly and brings its driving pulley into contact with

size weighs 4 or 5 lb., and is loaded to 400 W. Dowsing models range from a 50-W hat brim iron weighing 1 lb. 5 oz. up to a storage type which is detached from the heating plug before use.

The heating element fitted by the Cooper-Stewart Engineering Co., Ltd., covers the whole of the sole of the iron. The larger types have a cooling air pas-



The "Swinton" iron

sage in the wooden handle and the "Little Sunbeam" has a fireproof art-steel case in which the iron can be put away hot and locked. Alliance Wholesale, Ltd., recently commenced to manufacture the "Russell," which has a chamfered toe and inclined surface ground smooth to prevent its damaging delicate fabrics.

Instead of the ordinary connector, the "Hotpoint" has a hinged plug, and it will also stand upright on its heel so obviating the need for a separate stand. A light-weight iron with a convex sole plate is also supplied for polishing collars and other starched articles. The Hawkins automatic iron switches itself off when the temperature reaches 575 deg. F. The newest of the "Revo" models is fitted with a handy heat indicator, which shows at a glance when the iron has reached the correct temperature.

Siemens-Schuckert fit a switch below the handle with which the heat range can be adjusted between 160 and 240 deg. C. When set the desired temperature is maintained constant. The Z Electric Lamp & Supplies Co., Ltd., sells its "Zeda" household iron for 8s. 6d. only. Other well-known makes are British Electric Domestic Appliances, Ltd.; the Forward Electric Co., Ltd.; "Ediswan"; "Siemens-Xcel"; "Creda"; Bulpitt ("Swan"); Hattersley Bros. ("Swinton"); Carron; Bustler "Triumph"; Premier; Shaw ("Trojan"); Chesterton Jones; Domestic Appliance Co.; Berkeley & Young; H. G. Moseley; "Tricity"; "Magnet"; "Efesca," &c.

The "Castle" iron stand manufactured by A. Revrolle & Co., Ltd., obviates the risk of burning the ironing table. The stand is attached to, and forms part of, the cable; each time the iron is placed on the stand its weight operates a small ball switch.

Left, the "Efesca"; right, the "Joy-wheel"

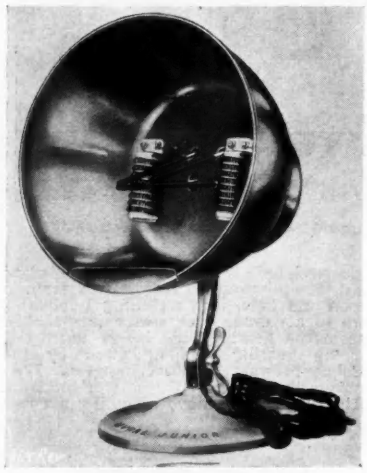
Section VII.—Electric Health Appliances

How warmth, "sunlight," massage and exercise are provided

Electricity is entering more and more into the field of health promotion and preservation, and in many ways is directly supplementing the good effects which its general use produces

"THERMEGA" blankets can be used anywhere and everywhere, being suitable for 100/250 V a.c. or d.c. Three-heat control is provided, giving approximately 100, 130, and 160 deg. F. A thermostat maintains a constant temperature, and it is enclosed in a vacuum tube to prevent sparking; a fuse in a fibre tube is also fitted. The standard 32 in. by 44 in. blanket costs three guineas, and the 12 in. by 16 in. pad £1 11s. 6d. Larger sizes are available.

The "Sunbeam" 12 in. by 15 in. pad, made by the Cooper-Stewart Engineering Co., Ltd., has three-heat control and costs 35s. It has an eiderdown cover which is wet-proofed inside for keeping a wet compress hot. The pad marketed by Siemens-Schuckert (Great Britain), Ltd., has automatic temperature regulators, and a



The Ediswan "Uvral" lamp

rotary switch with raised markings which facilitate adjustment in the dark.

"Sanotherm" pads and blankets are obtainable from Mr. Carl Strich as well as the Medical Supply Association, Ltd., which also markets the "Q-Ray" electrically heated compress outfit. Surrounding the compress is material which provides radio-active emanation.

The "Dowsing" bed warmers are cylindrical and of the heat storage type, being disconnected from the plug point before use. Bedwarmers are also produced by the G.E.C., John Shaw & Sons, Sturge & Baker, and the C.C.A. Falk, Stadelmann and Co. supply a heated floor mat.

Radiant Heat

Dowsing's simple infra-red radiator, available at 30s., consists of an exposed resistor coil wound on a porcelain former inside a polished bell reflector. Larger patterns, on adjustable stands, are sold by the Medical Supply Association.

Cabinets, fitted with incandescent tungsten-filament lamps and reflectors, are used as "light baths"; they vary in size from the whole-body type to small folding portable models for application to any part of the body. Among them is the "Emesay," which weighs but 7 lb., and costs £5 10s. The "Radiobeam" pedestal model has a single 1,000-c.p. lamp in a hood reflector, and there are also hand lamps (costing 25s.) and clip-on types. The "Dowsing" is a recently introduced model.

A special feature of the "Solus" radiant heat bath is that it is provided with earthing arrangements.

Artificial Sunlight

The "Vitalux" lamp of the M.S.A., Ltd., produces ultra-violet rays as well as heat rays. There are table and floor standard forms, each fitted with a 500-W tungsten filament lamp with a "Vita glass" bulb and a chromium-plated reflector. Quartz mercury-vapour lamps of various sizes are obtainable.

The "Neron-Vitalux" sun-ray lamp is marketed by the General Radiological and Surgical Apparatus Co., Ltd., and the A.E.G. Electric Co., Ltd., and a neat combined light and heat producer is the "Quain" nickel-plated copper bowl arc reflector. The lower segment of the bowl accommodates two spherical heating elements. This lamp costs £5 10s.

The "Ediswan" twin arc model also incorporates two resistance heaters, and is arranged to stand or be hung on a wall and tilted at any angle; it functions automatically at all voltages, a.c. or d.c. The Lumsden table lamp has a d.c. resistance in the pedestal and a separate transformer for a.c. There is also a hanging pattern, both mercury vapour types, and such accessories as applicators, localising masks, goggles, and a treatment timing alarm clock. The "Homesun" made by the British Hanovia Quartz Lamp Co., Ltd., is not unlike an adjustable reading lamp in appearance. It is of the mercury type (280 W).

The "Sunica" mercury lamp of the General Electric Co., Ltd., has an adjustable polished aluminium reflector; the loading is 500 W. The "Sunic" carbon arc outfit is in two parts, supported on an adjustable stand. The arc is above and a resistance heater below.

The newest u-v lamp is an "Osram," suitable for a.c. only. A transformer of special design is in the base of the adjustable standard, which carries a reflector and 400-W lamp. An arc is struck between two cylindrical tungsten electrodes, and vaporises the mercury in a glass bulb.

The "Stella Vita" incandescent bulb sun lamp, table model with reflector, is marketed by A. Brodersen.

Stimulators and Vibrators

In the so-called "violet-ray" apparatus the stimulant is high-frequency electricity, not light. In this class are two "Ediswan" outfits: one is "universal" and the other for battery operation. The loading is 25 W. and the mechanism is suitably controlled for even current regulation. L. G. Hawkins & Co., Ltd., guarantee their outfit for 100-250 V, its price being 59s. 6d. Oswald Record &

The "Vio-Ray" h.f. apparatus

Co. market a simple and two more elaborate sets under the name "Velmag"; M.S.A. and Calvete outfits are "universal," and the "Dowsing" is of recent introduction.

The "Ediswan Uvral" pneumatic massage device is suitable for a.c. or d.c., but has no motor and is shockproof. Instead of rubbing, rapid air vibration on the skin is employed.

The Siemens-Schuckert thermo-roller enables both warmth and massage to be applied simultaneously. The device weighs 12½ oz. and costs £2 7s. 6d. Its loading is 50 W, and an automatic temperature regulator prevents risk of burning the skin. It is heated by plugging into a socket, from which it is withdrawn before use.

"Sanitas" violet-ray high-frequency outfits are obtainable from Mr. Carl Strich as well as vibro-massage equipment. High-frequency stimulators are also supplied by John Shaw & Sons, their "Trojan" outfits ranging from 45s. to six guineas in price, according to size.

Pleasant energising exercise without effort is afforded by the G.E.C. stimulator, which is a small extra-short armature ball-bearing table or pedestal motor. The shaft ends have eccentric projections to which two ends of a belt are attached, and a rolling vibro-massage effect is thus obtained. The "Thor" machine marketed by the Hurley Machine Co. (England), Ltd., is similar in action, but has a universal voltage motor geared to a crank, the whole being attachable to a convenient projection by a screw clamp.

Miscellaneous

For electric muscular exercising "Solus" and M.S.A. faradic Bristow

The "Osram" vibro-massage set

coils fitted with interrupters and surgers are obtainable in portable cases which include the batteries.

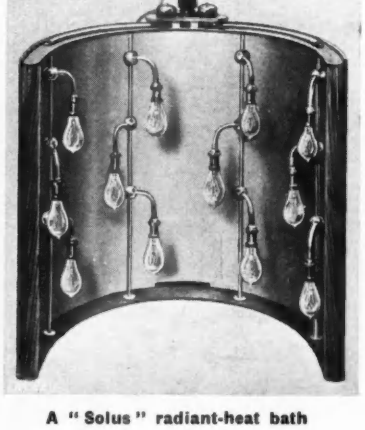
There are also paraffin wax baths of varied shapes and sizes for the treatment of circulatory and rheumatic ailments. Those made by Ingleby Motors (Leeds) are of white enamelled iron or glazed fireclay, and are fitted with a three-pin mains plug with switch and fuses on the wall; the loadings range from 5 to 10 A at 200 V a.c.

Strong copper bronchitis kettles are supplied by Bulpitt and Sons, Ltd., Premier Electric Heaters, Ltd., and Dowsing's, fitted with 500-800-W elements and protective devices.

Bulpitt's and Dowsing's surgical instrument sterilisers are made with renewable dual elements and three-heat control, with loadings of from 350 to 4,000 W; a water-level indicator and drain-off tap are included. Two 400-W elements are also fitted by the White Electrical Instrument Co., Ltd., with bi-metal temperature control, in conjunction with two mercury switches, one set in advance of the other. Sterilisers are also made by Siemens, Premier, and the M.S.A.

The air conditioning apparatus of Ozonair, Ltd., is well known. Besides large and small deodorisers an ozone generator is combined with an electric fan for domestic use. The "Quain" ozoniser is an attachment which can be fitted to an electric fan.

For inhalation treatment, the John Shaw "Trojan" atomiser, priced at 20s., produces a steady stream of vapour, while a mask respirator is used in conjunction with the "Atmas" "nebuliser" marketed by the General Radiological & Surgical Apparatus Co., Ltd., a small electrically driven air compressor being utilised to force the medicament through a "Spiess" nozzle and effect atomisation.



A "Solus" radiant-heat bath

Section VIII.—Clocks

Inexpensive and reliable mains-driven frequency-controlled timekeepers

The synchronous a.c. clock has come rapidly to the front during the past year or two. Its reliability is coupled with simplicity of operation, and ordinary clocks of comparable timekeeping precision cost at least four times as much, while the amount of electricity consumed and the effects of friction and temperature changes are negligible

THE electric clock is connected to the mains by a fused plug and socket; the hands are set to the correct time, and a twirl of the starting spindle then sets the clock going. The usual spring and escapement mechanism are replaced by a tiny electric motor, so designed that its speed is proportional to the supply frequency; it cannot therefore run slow or fast.

The "Synclock" was introduced to England over three years ago by Everett, Edgcumbe & Co., Ltd., who are again first with a model which strikes hours and half-hours; its price is £3 17s. 6d. This make of clock is of the self-starting variety, the advantage of which is that it is not stopped by the momentary interruption of electricity supply. If a prolonged stoppage occurs to affect the timekeeping, a red warning disc appears on the dial.

Ferranti, Ltd., are one of the largest makers. Their models have a centre seconds hand in addition to the usual hour and minute hands, and they also have a 3.5 in. drum model designed to fit in the place of spring-driven mechanism for the conversion of existing clocks.

The General Electric Co., Ltd., also has standard interchangeable drums; in this case they are all-insulated, the movement being geared direct to the 200 r.p.m. motor. The "K.C." models are illuminated by "Osram Striplite," which projects the light through the edge of the glass dial panel; the loading is 30 W, and various colour effects are obtainable.

Included in the range of Smith's English Clocks, Ltd., are combined lamp and clock table and bedside models, and a "grandfather" which can be used as a bookcase.

Other makers are the Edison Swan Electric Co., Ltd., the Telephone Manufacturing Co. (1929), Ltd., and Best & Lloyd, Ltd., who combine an adjustable desk lamp with a clock, both fed by the same flexible lead.

The range of the Rothermel Corporation, Ltd., includes a kitchen model in a rustproof case. The "Firefly" incorporates an electric alarum that persists until switched off, while the illuminated translucent dial is lighted from a small lamp behind, which is controlled by a switch, so that it can be turned off in the daytime.

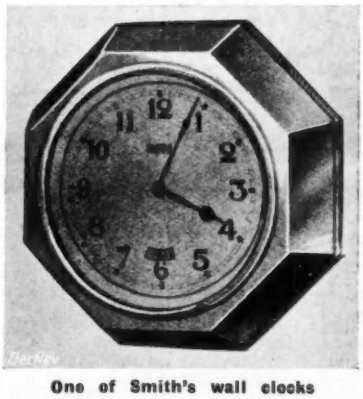
The production of a.c. clocks is a new departure for the Junit Manufacturing Co., Ltd.; the fastest moving part rotates at 120 r.p.m., so wear should be small.

A striking "Synclock"

A Best & Lloyd combination

The Sun Electrical Co., Ltd., uses a 200-r.p.m. rotor and two stages of worm gearing to drive its "Suncomains" clocks. Although the loading is only 0.5 W, the movement will operate hands for dials up to 2 ft. 6 in. in diameter. The whole mechanism is enclosed in a "Bakelite" moulding, in which there is a concealed well-insulated two-pin plug connector.

Synchronous clocks are available in all sizes and shapes of dials and cases at prices which range from thirty shillings to several pounds according to design.



One of Smith's wall clocks

Electric Winding

A running error of less than one minute per month is claimed by the Stonebridge Electrical Co., Ltd., the distributors of the "Inducta" clock, which is made by Landis & Gyr, Ltd. The movement is actuated by a spring, which is wound at intervals by a mains-driven motor, with sufficient reserve to ensure that the clock will continue to work for three days in the event of a failure of the electricity supply.

Two types are available: the a.c. pattern has a Ferraris motor permanently in service, the winding being limited by a simple mechanical brake, which avoids the use of a contact switch. For d.c. a commutator motor is used in conjunction with a resistance; temperature compensation is provided for, and the lever escapement has eleven jewels and a locking device for safety in transit.

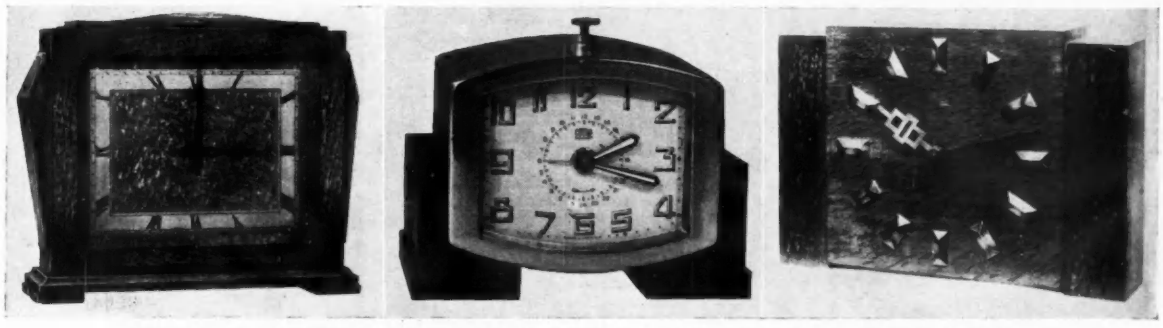
One of two novelties made by the Société Industrielle d'Horlogerie et d'Appareils Electriques of Paris is an electric alarm clock which rings for one minute. An accessible knob permits the alarm to be silenced at will or permanently. Another interesting innovation is a combined bedside reading lamp and alarm clock, in which the lamp is switched on automatically as the bell commences to ring. A knob serves to prevent automatic lighting if desired, and the lamp can be switched on and off in the usual way without affecting the timekeeper in any way.

These "Cotna" clocks are driven by a spring with sufficient reserve for six hours' operation. The speed of the motor is controlled by a brake which keeps the spring wound continuously as it is running down. The incorporation of a circular pendulum obviates the necessity for levelling these clocks.

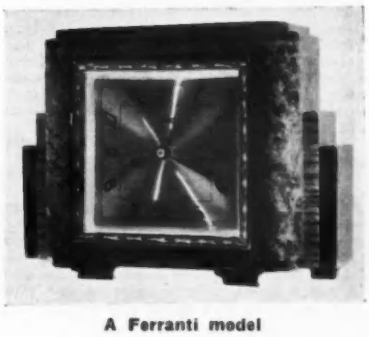
An accuracy within three seconds per week is guaranteed by Gillett & Johnston, Ltd., who make master clocks and utilise the periodic fall of a gravity lever to impart regular impulses to the pendulum. The lever, in falling, also functions as a switch to transmit simultaneous impulses to secondary "slave" dials connected in a simple series battery energised circuit. Uniformity of time is thus secured throughout the installation, key winding is dispensed with, and bells or signalling devices can be operated in synchronism.

The Synchronome Co., Ltd., makes master clocks of remarkable precision, and Gent & Co., Ltd., manufacture the "Pul-syn-etic" type of impulse clock as well as the "Electro-matic" frequency-controlled pattern, including an illuminated dial model.

The Bulle Co., Ltd., has an unconventional design of the electro-magnetic pendulum type. It is self-contained, has no main spring, and does not need winding, being driven by a small dry battery, which keeps it going for about 800 days, and is thus independent of electricity supply. There are a hundred different designs to suit every home and pocket.



Left, a "Suncomains"; centre, the "Cotna" alarm; right, an "Electro-matic" (Gent & Co.)



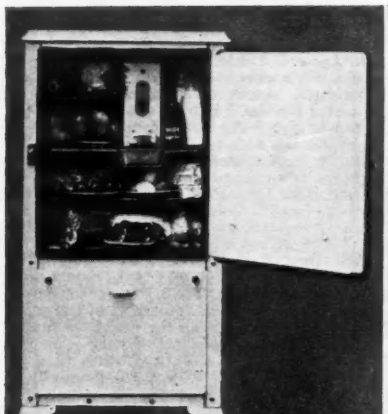
A Ferranti model

Section IX.—Refrigerators

Models suitable for every type of dwelling

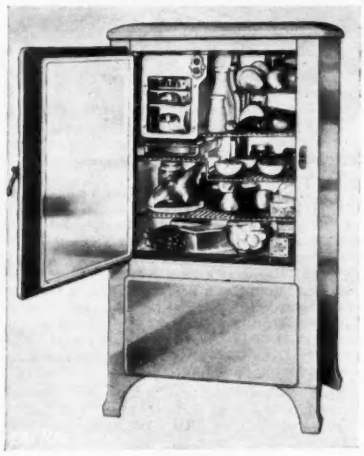
There is every reason why the electrical industry as a whole should foster domestic refrigeration, and the following notes relating to equipment available in this country show that it can no longer be claimed that the idea is impracticable, at least on account of the size of the apparatus

IN view of the fact that the current consumption of a refrigerator is so small, we do not consider that this is a point of much consequence, and therefore have not mentioned the motor sizes; indeed, all the most important points of a refrigerator from the domestic point of view are non-electrical. The exterior finish varies with different makes, but white porcelain has been standardised as an interior finish for all models.



Left, "Crypto"; right, "Vac-Trio"

The present tendency of manufacturers is to concentrate on models with internal capacities round about four cubic feet, and the only company to go below that in size is Electrolux, Ltd.



"Kelvinator"

Broadly, there are two types of domestic electrical refrigerators on the market—compression and absorption. In the former type an electrically driven compressor maintains a difference of pressure in the system to allow for evaporation (during which heat is absorbed) and condensation of the refrigerant, and in the latter type the refrigerant in the gaseous form is absorbed by water from which it is liberated by heat from a suitable electrical element and then condensed ready for evaporation for heat absorption.

Practically all, if not all, domestic models are automatically controlled, switching on and off at all times of the day and night.

The running costs of refrigerators vary with the type of equipment, but they are not really a serious item. The electricity consumption is probably about 1 kWh per day for the smallest units, and in some cases, where water is used for cooling, there is a water charge of about £1 per annum. The charges can often be more than met by economies possible with a refrigerator.

The "Electrolux" is the only absorption refrigerator with which we are concerned, and it therefore differs from all the other makes (compression type) in that it is water cooled, except the smallest model. The "Electrolux Minor" costs £19 10s., and its external dimensions are 1 ft. 11½ in. by 1 ft. 7¾ in. by 1 ft. 7½ in. (all measurements are height by width by depth), while the internal storage capacity is 1 cu. ft. Model R3, priced at £29 15s., has a capacity of 3.2 cu. ft., a shelf area of 4½ sq. ft., and external dimensions of 3 ft. 0½ in. by 2 ft. 2¾ in. by 1 ft. 8⅜ in. Model D4 costs £35 10s., with a storage capacity of 4 cu. ft., and 7 sq. ft. of shelf area; its external measurements are 3 ft. 2¼ in. by 2 ft. 8 in. by 1 ft. 8 13/16 in.

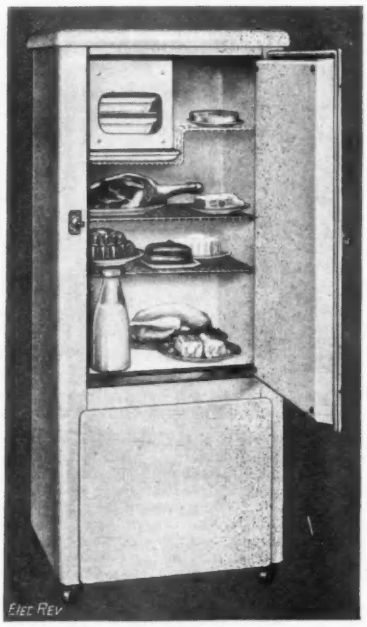
A model with a capacity of 6 cu. ft. (G6) can be bought for £54 15s. In this case the shelf area is 10½ sq. ft., and the dimensions 2 ft. 11⅜ in. by 2 ft. 1⅜ in. by 2 ft. 1⅜ in. Types D7 and D10 are fitted with an upper and lower door, have capacities of 7 cu. ft. and 10.2 cu. ft., and are priced at £72 10s., and £85, respectively; the dimensions are 4ft. 6½ in. by 2 ft. 11 in. by 1 ft. 10⅞ in (model D7), and 4 ft. 10⅞ in. by 3ft. 2⅞ in. by 1 ft. 11⅜ in. (model D10). All the "Electrolux" refrigerators are finished internally in washable enamelled steel.

"Frigidaire"

Lancasnire Dynamo & Crypto, Ltd., refrigerator has an interior capacity of 4 cu. ft., with exterior dimensions of 52½ in. by 25 in. by 21 in., and a shelf area of 6¾ sq. ft. The exterior finish is of white cellulose on steel. The price is £42.

A feature of this equipment is the evaporator coil immersed in brine to afford a better accumulation of cold, thereby necessitating less frequent starting and stopping of the machine.

Kelvinator, Ltd., markets several models of different sizes, from the D11 at 140 guineas, with a capacity of 12 cu. ft. and a shelf area of 23 sq. ft. (external measurements 68½ in. by 48 in. by 28⅜ in.), to the K4 (4 cu. ft.), with 8¼ sq. ft. of shelf area and measuring 49½ in. by 26 in. by 24½ in. outside. In between these are the K5 (5 cu. ft)., with a shelf area of 10½ sq. ft., and dimensions of 51½ in. by 28½ in. by 25⅜ in.; K7 and S7, both 7 cu. ft., but K7 with a shelf area of 14½ sq. ft. and exterior measurements of 57 in. by 31⅜ in. by 25⅜ in., while S7 has a shelf area of 15 sq. ft., and measures 58⅜ in. by 31½ in. by 25¼ in. Models K4, K5, and K7 are finished outside in white lacquer enamel on rustproof steel; they are priced at 39, 49, and 59 guineas, respectively. Models S7 (at 93 guineas) and D11 are finished in white porcelain.



"Marco"

Frigidaire, Ltd., markets eight models, ranging from the WS3, with a capacity of 4 cu. ft., to the W18, with a capacity of 21½ cu. ft. WS3, priced at £54 10s., has a shelf space of 6¼ sq. ft., and measures 49½ by 24 by 19½ in. ML4, also costing £54 10s., has a shelf space of 9 sq. ft. and an interior capacity of 4⅜ cu. ft., with external dimensions of 53 9/16 by 24 by 19½ in. Model ML5, at £62 10s., has a capacity of 5⅞ cu. ft., with external measurements of 54¼ by 26¼ by 23 in.

The larger models which follow all embody the "Frigidaire" hydrator for keeping salads. There is the WS5, costing £75 and measuring 58⅜ by 28½ by 24½ in., with a capacity of 6⅜ cu. ft., and a shelf area of 8¾ sq. ft. Another model, the W6, has a shelf area of 12¼ sq. ft., a capacity of 7⅜ cu. ft., and dimensions of 65¼ by 31⅜ by 24½ in. The price is £89. A more expensive model, costing £115, is the W8, with a capacity of 10 cu. ft. and a shelf space of 13¼ sq. ft.; exterior dimensions are 61⅜ by 35⅜ by 28¼ in. Type W10 contains 2¼ cu. ft. of extra storage space, with 5 sq. ft. more shelf space for an extra £20 in cost; the

measurements are 66½ by 37¼ by 28¼ in.

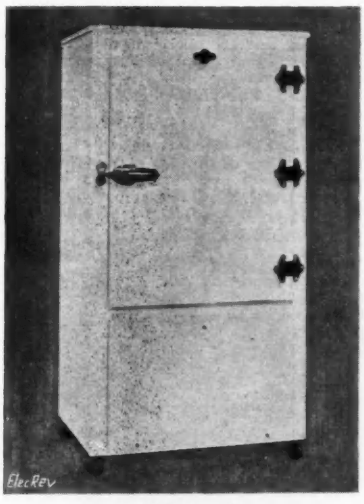
The two largest models are the W12 and the W18, the former with a capacity of 16 cu. ft. and a shelf space of 19⅔ sq. ft., and the latter with a capacity of 21½ cu. ft. and a shelf space of 27 sq. ft., with dimensions of 71 by 46½ by 28½ in., and priced at £175. No. W12

" Electrolux " G.6

costs £20 less, and measures 66½ by 46½ by 28¼ in. The finish of all models, except ML4 and ML5, is white vitreous porcelain on steel. Models ML4 and ML5 differ in exterior finish, employing white " Duco " cellulose.

Marco Refrigerators, Ltd., have nine types. The smallest is the " Whitehall," measuring 51 in. by 25½ in. by 19 in., and costing 39 guineas. The next model is the DG5, with dimensions of 57½ in. by 23½ in. by 20 in., and a capacity of 4½ cu. ft.; the shelf area is 7½ sq. ft., and the price 40 guineas. The DM10 (60 guineas), DM15 (70 guineas), and MD18 (80 guineas) are two-door models, having capacities of 7½ cu. ft., 11½ cu. ft., and 14½ cu. ft., and shelf areas of 13½ sq. ft., 19 sq. ft., and 22 sq. ft., respectively. The measurements of the three models are 63 in. by 34 in. by 20 in., 69 in. by 38 in. by 22 in., and 71 in. by 46 in. by 25 in., respectively.

The AP models, also with two doors, are designed for large households. AP10 (72 guineas), AP15 (85 guineas), and AP18 (95 guineas), have capacities of 7½ cu. ft., 11½ cu. ft., and 18½ cu. ft., and shelf areas of 13½ sq. ft., 19 sq. ft., and 22 sq. ft., respectively; the measurements are as follows: AP10, 63 in. by 34 in. by 20 in.; AP15, 69 in. by 38 in. by 22in.; AP18, 71 in. by 46 in. by 25 in. The last of the Marco models is the Table Five, which is designed for use as a table, and has dimensions of 30 in. by 44½ in. by 21½ in., with a food



" Chillaire "

storage capacity of 5 cu. ft., and a shelf area of 7 sq. ft.; it is priced at 45 guineas. Finish of all except the AP models is in white cellulose on steel. The AP type has a porcelain finish.

The " Busy Bee " (Drake & Gorham Wholesale, Ltd.) is made in four types from the " Minor 12 " (£38 10s.) to the " M " (£115 10s.). The " Minor 12 " measures 51 in. by 22¼ in. by 18½ in., has a shelf space of 6 sq. ft., and a food-storage capacity of 4¼ cu. ft. Model " M " has a food-storage space of 25 cu. ft., with dimensions of 73⅔ by 49¼ by 28 in. Intermediate models are the " Junior " (£50) and " H " (£69), with capacities of 5¼ and 7⅔ cu. ft., and shelf areas of 6 and 10⅔ sq. ft., respectively. The dimensions of the " Junior " are 56¼ in. by 27⅔ in. by 23 in., and those of model " H " are 65 in. by 31½ in. by 21⅝ in. All " Busy Bee " refrigerators are finished in white " Duco " cellulose.

The " Chillaire " refrigerators (Orme, Evans & Co., Ltd.), " 500 PP " (£62) and " 750 PP " (£89) have shelf areas of 8 and 12 sq. ft. and capacities of 5 and 7½ cu. ft., while the dimensions are 54 in. by 23 in. by 22 in., and 57 in. by 30 in. by 24 in. The standard finish is white porcelain, but models (known as " 500 PC " and " 750 PC ") can be obtained in cellulose lacquer finish (exterior).

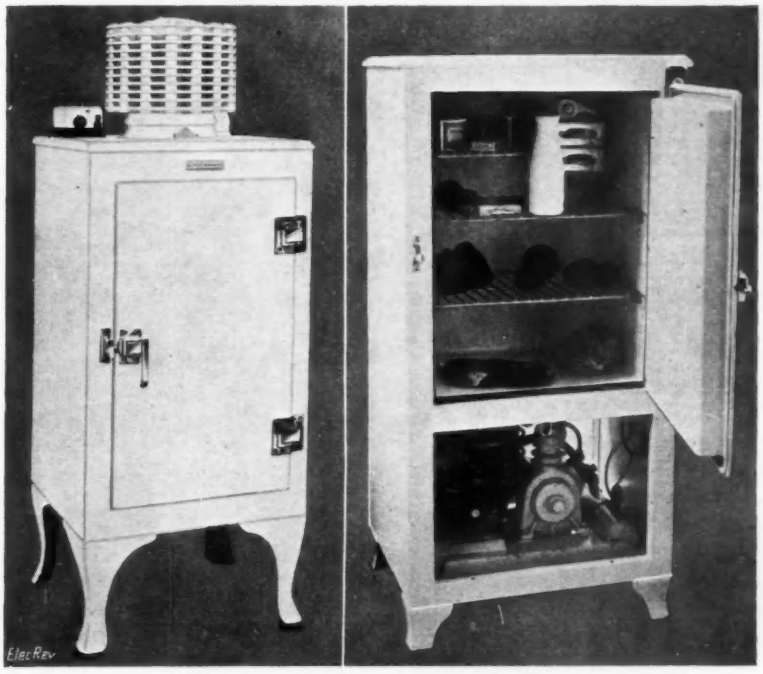
The " Leda " refrigerator (Leda Electric, Ltd.) costs 35 gn. The finish is in sprayed cellulose, and the shelf area is 8 sq. ft. A capacity of 5½ cu. ft. is provided, with external dimensions of 50½ in. by 24½ in. by 22½ in.

The six B.T.-H. refrigerators range in size from the model " SS-42 " (4.4 cu.

The B.T.-H. (SS-82)

while a 9-cu. ft. intermediate equipment has a shelf area of 15 sq. ft. and measures overall 2 ft. 4 in., 2 ft., and 4 ft. 8 in. high.

The Mag Engine Co., Ltd., undertakes



Left, the B.T.-H. SS-42; right, " Leda "

to supply compressor units to suit almost any size of cabinets. The compressor operates in a " brine " tank.

ft.), measuring 64 in. by 11¼ in. by 21¼ in., with 7½ sq. ft. of shelf area, to " SS-180," a de luxe two-door model with dimensions of 68¼ by 65 in. by 26¾ in. and a capacity of 18.2 cu. ft. The intermediate models " SS-62 " (6.7 cu. ft.) and " SS-82 " (8.5 cu. ft.) both have single doors and measure 66¼ in. by 28 in. by 22¼ in., and 68 in. by 34½ in. by 26 in., respectively. Two double-door types, " SS 100 " (10.7 cu. ft.) and " SS-140 " (14.6 cu. ft.) measure 65 in. by 44⅔ in. by 24 in. and 66⅔ in. by 54½ in. by 24½ in. The prices of the B.T.-H. refrigerators (International Refrigerator Co., Ltd.) are: " SS-42," £58; " SS-62," £75; " SS-82," £100; " SS-100," £117; " SS-140," £136; and " SS-180," £160; the exterior finish is in white " Sanak."

The only model marketed by Vactric, Ltd., is priced at 34 gn. The capacity is 5 cu. ft. and the shelf area 9.75 sq. ft., while the external measurements are 55¼ in. by 25 7/16 in. by 23⅜ in. The finish is in sprayed cellulose on steel.

The three models manufactured by British Automatic Refrigerators, Ltd., are each duplicated in all respects except exterior finish. " K " range models are finished in white " Duco " cellulose, while the " J " equipments have porcelain enamel interiors. The smallest model has a food-storage capacity of 6 cu. ft., a shelf area of 9 sq. ft., and overall dimensions of 2 ft. wide by 2 ft. deep by 4 ft. high. The largest model has corresponding figures of 15 cu. ft., 21 sq. ft. and 3 ft. 6 in. by 2 ft. 2 in. by 5 ft. 4 in.,

" Busy Bee " (Drake & Gorham Wholesale)

Section X.—Labour-saving Devices

Appliances for many purposes

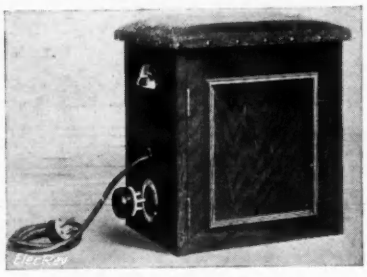
In gathering information from a very wide field as we have done for this Domestic Special number, a collection of many appliances, &c., which it is impossible to classify under more definite headings is inevitable. We have endeavoured to set out such equipment in the following notes in convenient order. The heading under which the appliances are placed is, of course, applicable to *all* electrical appliances

THE fact that the operation of a large proportion of domestic electrical equipment—refrigerators, washing machines, vacuum cleaners, &c.—depends upon the small motor demands that this should be given special notice, apart from attention given to the complete equipments.

Klaxon, Ltd., produce a comprehensive range of fractional h.p. motors and geared motor units from 1/250 to ¼ h.p. The motor and the gearing are integral

The Cooper-Stewart hair dryer

in one housing. Type U.S.M. 10040, 1/50 h.p., 4,000 r.p.m., 110/115 or 200/250 V, a.c. or d.c., is designed for sewing machines. It has ball bearings and is built on "Bakelite" and protected by end covers of the same material. Type K.M.U.S.W.R. 10140 has a worm reduction gear giving final speeds of from 50 to 400 r.p.m., the torque being from 0.75 to 2.5 lb.-in. The motor is ventilated enclosed, weighs 2 lb. 8 oz., has a commutator end cover and feet of "Bakelite,"



A concealed "Metrovick" meter

and is available in 1/100 (2,500 r.p.m.), 1/60 (4,500 r.p.m.), and 1/40 h.p. (6,500 r.p.m.).

Among the outstanding features of the motors produced by Higgs Motors are large shafts and bearings of phosphor-bronze or the ball type, silent and vibrationless operation, and sliding box-type bush holders. The motors are made in from ⅛ to 1-h.p. sizes, 1,400 r.p.m., for a.c. and d.c. A ⅛-h.p., 1,425-r.p.m. d.c. motor costs £3 17s., a ¼-h.p., 1,400-r.p.m. split-phase induction motor costs £4 8s., and a ½-h.p., 2,800 r.p.m. repulsion-start induction motor costs £6.

The British Thomson-Houston Co., Ltd., produces a range of similar motors for all domestic purposes.

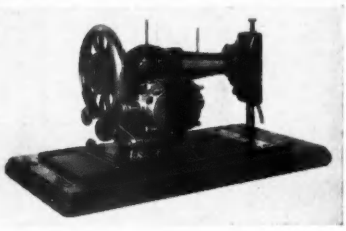
Motors produced by Bulpitt & Sons, Ltd., for domestic work include both d.c. and a.c. types and all sizes up to 1 h.p. A motor unit sold by Siemens-Schuckert (Gt. Britain), Ltd., has a reduction gear incorporated and carries a special attachment for fixing various "tools," enabling the unit to be employed on many kitchen services.

Sewing machine motors produced by the General Electric Co., Ltd., include type DM 280, for driving any domestic machine by a small endless belt. It is fitted to the machine by a single screw, and a bracket is slotted to take care of belt slackness. Type DM 282 drives the machine by friction contact, and it does not require fixing. Type D.M. 284 is suitable also for light tailoring or dressmaking, the motor base being slotted to take up belt slackness. These motors cost £5 5s., £5 5s., and £7 18s., respectively.

The following features pertain to the single-phase repulsion-start induction motors produced by the Century Electric Company: phosphor-bronze bearings, wool-yarn lubrication; large ground and polished shafts; dust-excluding collars; a positive robust governor device, and large area brushes. The motors are available in sizes from ⅛ h.p. upwards.

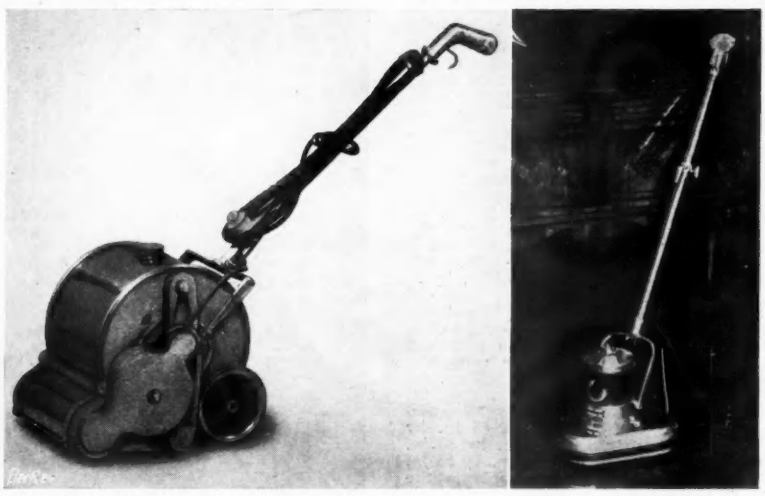
A flexible-shaft outfit produced by Herbert Terry & Sons, Ltd., has a ball-bearing flexible shaft, 6 ft. long, coupled to a ¼-h.p., 2,800-r.p.m. motor, and is provided with a varied range of accessories such as polishing mops, &c. It is available for £5.

The production of bearings for small



A G.E.C. sewing machine motor

motors is a speciality, and many of the motor manufacturers obtain the bearings from such concerns as the Skefko Ball Bearing Co., Ltd., and the Hoffmann Manufacturing Co., Ltd. For the smaller types of motors it is essential that high-quality oil be used. "Wakefield Oilit," produced by the makers of "Castrol" motor oil, is an example of such special lubricant.



Two floor polishers: Left, Modern Domestic Equipment; right, the "Electrolux"

Pumping Outfits

Electric driving is particularly well suited to domestic pumping, because, *inter alia*, of the essentially compact nature of the combined pump and electric motor.

The "Good Egg" pump, produced by F. W. Brackett & Co., Ltd., has a capacity of from 150 to 600 gal. per hour, with a maximum head of 50 ft. The motor loading is 400 W, and any standard supply conditions for d.c. and single-phase a.c.

Three little motors suitable for domestic use. Left, Higgs Motors; centre, B.T.-H. Co.; right, a "Klaxon" geared motor

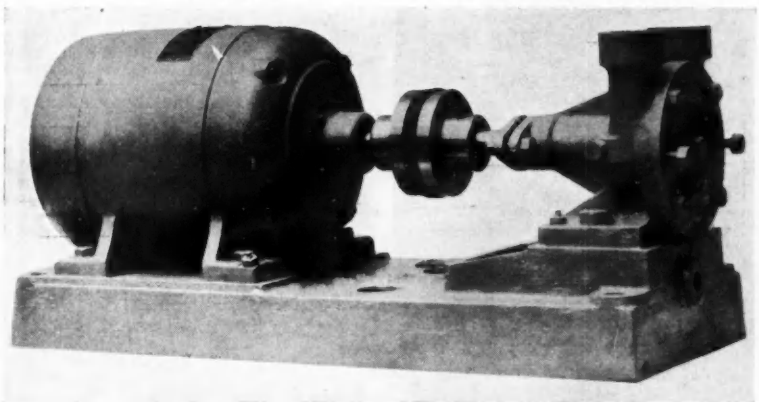
can be catered for. The prices, including the motor, pump, "Seaborne" interceptor mounted on a wood base, d.p. enclosed switch-fuse, s.p. float switch, wood float, cord, pulleys, &c., are £16, d.c., and £18, a.c.

Two principal types of motor pump

A Mann Egerton pumping set

supplied by the G.E.C. are the G.1 in five sizes from 3 to 10 h.p., 3-phase, and the G.F. in 2-h.p., 3-phase, and d.c. models. The pump casing is fixed to the motor bearing bracket by a heavy ring support provided with a spigot secured by set screws.

The "Centrivac" pump produced by



"Centrivac" pumping equipment (Pulsometer Engineering Co.)

the Pulsometer Engineering Co., Ltd., consists of a rotor set eccentrically in the casing and having two vanes, each carried in slots across the rotor. It is available in various sizes, costing from £6 5s. to £15.

In the shallow-well pumping equipment produced by the Glasgow Electrical Engineering Co., Ltd., the pump and motor are mounted on a steel tank base which acts as a water reservoir (about 5 gallons) when used with a pressure system, or as an air vessel when used with an open tank and float control.

A Calvete hair dryer

The whole outfit is neatly enclosed in an enamelled-iron casing. Two sizes are available—175 and 350 gal. per hour—and the pumps will work on 22 ft. suction and 40 to 60 ft. delivery.

The duty of the "Boulton" (Boulton & Paul, Ltd.) self-lubricating pump for shallow wells is 260 g.p.h. against a total head of 80 ft., including a 22-ft. suction. The pump is self-lubricating and a ¼-h.p. motor is fitted. A deep-well unit of the same make has a duty of 330 g.p.h. against a total head of 200 ft., which will include a 150-ft. lift. This unit has a ¾-h.p. motor. Complete with a raised base, air vessel, and suction interceptor, ¼-h.p. motor, belt tightener, belt and pulleys, the small outfit costs £19.

Prepayment Meters

It is rather extraordinary that serious attention has not until comparatively recently been given to prepayment-meter control of fires in bedrooms and so on in hotels, &c., considering that prepayment meters have been doing efficient service in other directions for many years. Although it is probably a simple matter to render any of the service meters produced by such concerns as Measurement, Ltd., Ferranti, Ltd., Aron Electricity Meter, Ltd., and Messrs. Landis & Gyr suitable for hotel bedroom-fire service, some concerns have produced equipments specially for the purpose. Meters produced by Chamberlain & Hookham, Ltd., when supplied for use in hotels, &c., are fitted with a device by which the mechanism can be reset to zero at any time by the proprietor. The meters are made to take shillings, sixpences or pennies, the capacity of the coin drawer being 300 shillings.

The "Rad-Slot" meter produced by Venner Time Switches, Ltd., is the result of an effort to market an efficient meter for the particular use at a low price, and it is correct only at full and half loads. The prices are: 2 kW, £3; 3 and 4 kW, £3 5s. The rent collection meter by the same company is a cheap and simple equipment for collecting fixed charges, switching-on being effected by the consumer when inserting the required coins. The collector switches off by hand and resets. Six- and nine-coin models are suitable for up to 10 A.

The Metropolitan-Vickers Electrical Co., Ltd., has produced a prepayment meter specially for hotel-fire use, and it is supplied as a portable equipment camouflaged as a fire seat. It is equipped with foolproof plugs and neat side-carrying handles. The meter proper has a resetting device and can be supplied without the cabinet. With the cabinet a complete outfit costs £5 15s.

Time Switches

The proposition of the time switch control for hall and porch lighting, &c., is receiving increasing attention, not only because of its value as a household convenience, but also for its usefulness as a burglar alarm when the house is completely shut up, and there are no doubt many equipments suitable for home use, with or without slight modifications, among the products of such concerns as the Stanley Electrical Co., Abbey Electrical Co., Ltd., Acme Lighting and Eng. Co., Elkay Electrical Mfg. Co., Ltd. ("Columbus"); the Drayton Regulator & Instrument Co., Ltd.; Electrical Equipment & Carbon Co., Ltd.; William Geipel, Ltd.; D. M. Henderson & Co., Ltd.; the Horstmann Gear Co., Ltd.; Isenthal & Co., Ltd.; Landis & Gyr, Ltd.; Nathan & Allen, Ltd.; the Reason Mfg. Co., Ltd.; and Salford Electrical Instruments.

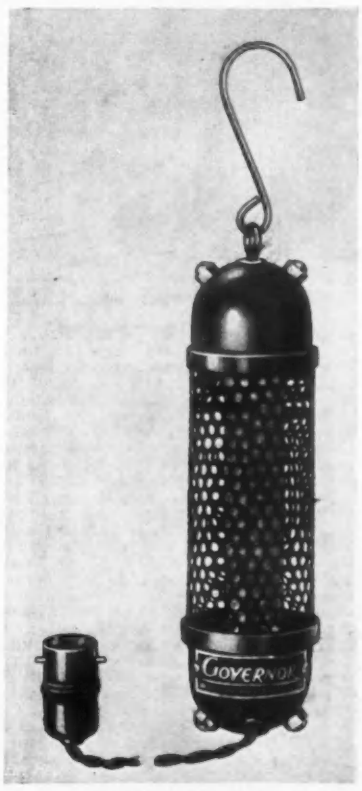
Among the companies which have given particular attention to equipment for domestic service are Venner Time Switches, Ltd., who produce model "BH," 1 A 250 V, s.p., which has an eight-day clock and solid-steel pallets in a wood case; and the Stonebridge Electrical Co., Ltd., which has a range of short-period switches for staircase lighting, &c. A selection from the models of the last company is type ZGU, which has a clockwork regulator actuated by a solenoid. The period of run-down is adjustable between the limits of one and three minutes.

The "Bedal" hair dryer

Bathroom Appliances

Among the bathroom auxiliaries a predominating item is the electrically heated towel rail. George Green & Co. have floor models from 30 in. by 24 in., 150 W, at £3 15s., to 36 in. by 36 in., 300 W, two top rails, at £7 6s. The Hotpoint Electric Appliance Co., Ltd., supplies two models "WTR, 24 in.," and "WTR, 36 in." (width measurements). Both are 36 in. high. The former is loaded at 200 W and costs £7 10s., having three single rails.

The "Xcel" (Siemens Electric Lamps & Supplies, Ltd.) towel rail is of the bracket type, 7½ in. from the wall, and fitted with two top rails 26 in. long. Rated at 125 W, it can be obtained for £1 15s. In white enamel, Benham & Sons, Ltd., make towel rails working on the same principle as the "Electro-Vapour"



A car-engine heater (Shaw)

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radiators. Various loadings of from 175 to 750 W are obtainable at from £9 to £10 10s.

The "Magnet" (G.E.C.) towel rails incorporate a 500-W heater and are priced at £4 15s. (20½ in. high) and £5 15s. (36½ in. high). The Barker & Young ("Unity") rail, costing £10 10s., operates with a loading of 250 W, and contains no liquid. The dimensions are 3 ft. 4 in. long by 3 ft. 1 in. high. The 200 W wall towel rail costing £2 17s. 6d. is 2 ft. 2 in. long.

The "Highlow" (Archibald Low & Sons, Ltd.) towel rail, 30 in. long with a loading of 75 W, costs 28s.; a similarly designed model of better quality costs £3, while a model of the same type with two top rails costs £4. Hot-water towel rails are available from £6 10s. (160 W) to £8 (300 W). The combined towel dryer and radiator loaded at 500 W, 30 in. long, 24 in. high, 6-in. projection, costs £5.

The two Belling (Belling & Co.) rails are priced at £2 10s. for the 180-W wall type (35 in. wide, 8 in. deep), and £5 17s. 6d. for the 750-W, floor type, measuring 35 in. wide by 33¼ in. high by 6 in. deep.

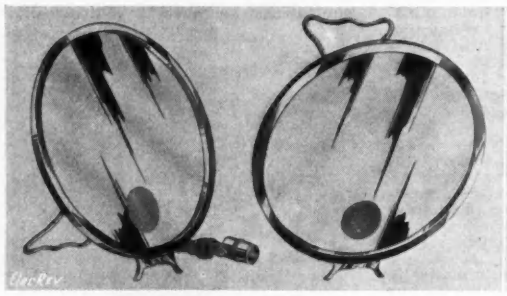
"Genii" (George Nobbs, Ltd.) electric hot-water towel rails are constructed of heavy-gauge, solid-drawn 1¼-in. brass

The "Sunairo"

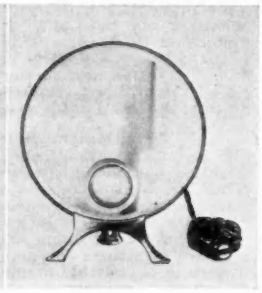
tubing, tested to 100 lb. per sq. in. A 36-in. by 36-in. (200 W) three-bar floor-type rail, nickel plated, is priced at £7 15s., and a floor and wall equipment, incorporating a 400-W panel radiator, n.p., costs £11 10s. Single- and double-rod towel racks, together with ordinary tubular heaters, are supplied as complete sets, 24 and 36 in. long, a 24-in. single-rod rack and heater costing £3 (n.p.).

The Edison Swan Electric Co., Ltd., makes towel airers with two top bars loaded at 300 W and selling at £2 17s. 6d. They are of the bracket type and measure 26 in. long by 9 in. high. The "Essenby" (Sturge & Baker, Ltd.) towel dryers consist of a double tier of rails with circular heaters in between; 500-W model 56s., small 125-W type 28s. 6d.

There are a few appliances for shaving, *i.e.*, the "Xcel" shaving pot with a capacity of ½ pint and a loading of 200 W, which sells at 16s., and the shaving mug marketed by L. G. Hawkins & Co., Ltd., loaded at 420 W and priced at £1 19s. 6d. An illuminated shaving mirror is marketed by the same firm for 21s., while another mirror 10 in. across is sold at 27s. 6d. by Metlex Industries, Ltd., who also market illuminated mirrors at 50s. (diameter 16 in.) and 54s. (18 in. by 14 in., oval or rectangular). Other firms making shaving mirrors are Falk, Stadelmann & Co., Ltd. ("Efesca") and the Edison Swan Electric Co., Ltd.



"Efesca" illuminated shaving mirrors



An "Ediswan" mirror

Hair Dryers

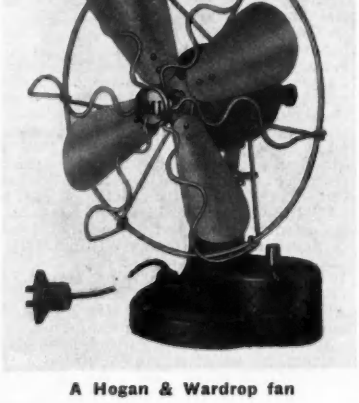
There is very little to say about hair dryers that cannot best be shown by an illustration. A number of firms have gone in for particularly clean lines; most of them have the lead taken through the

The Hawkins shaving mirror

handle, but there are exceptions. The hand-dryer is an interesting innovation but the price is still rather prohibitive to the majority of domestic users.

British Electric Domestic Appliances, Ltd., market the "Bedal" hair dryer, giving hot or cold air as required. The loading, with the heater "on," is 550 W, and the appliance is priced at two guineas. I. Calvete, Ltd., market the "Simplex," weighing 2 lb. and costing £1 16s., and the "Icall," a rather more robust model with a ball-bearing motor; it weighs 3 lb. and costs £2 17s. 6d.; hot or cold air. The fan revolves around the motor in both cases. A floor stand is available for £1 10s. and an air diffuser to fit on the end of the dryer costs 8s.

The Cooper-Stewart Engineering Co., Ltd., markets the "Sunbeam" focal heater for hair drying, taking the chill off the bathroom or for local heat.



A Hogan & Wardrop fan

Listed at 32s. 6d. the overall dimensions are 7 in. by 9 in., a fan-type hair dryer being equipped with a universal voltage motor. The "Magnet" hair dryer is priced at £2 7s. 6d. and weighs 3 lb. The Siemens-Schuckert dryer is loaded at 525 W; weight 2¼ lb. Vessco, Ltd., are making a model that is totally enclosed, including the handle, in "Bakelite," and is priced at 35s.

The "Supreme" electric hair dryer is sold by L. G. Hawkins & Co., Ltd., and is priced at 33s. The "Foen" hot-air douche is supplied by "Sanitas" Electrical Co., while the "Efesca" at 45s. is loaded at 400 W. Another firm supplying hair dryers is the Electric Domestic Appliances Co., which sells the "Edac" hair dryer at 33s.

B.T.-H. hair dryers are produced in five styles, four of them having "Fabrolite" cases. The motor runs at 3,000 r.p.m., and is loaded at 50 W, the heater being loaded at 500 W.

The "Efesca" curling-tong heater is loaded at 150 W, and sold for 15s. L. G. Hawkins & Co., Ltd., sell the "Universal" curling iron and n.p. hair drying comb together in an attractive case, and Archibald Low & Sons market a 300-W model at 55s.

Motor-car engine heaters are produced by the following companies: Messrs. Berkeley & Young, Ltd., flat type, 80 W, 7s. 6d., with enamel finish; Messrs. Bulpitt & Sons, Ltd., cylindrical suspension type, 100 W, 10s.; G.E.C., tubular suspension type, 50-75 W, 17s. 6d.; Messrs. Archibald Low & Sons, Ltd., tubular type, 75 W, 12s.; Electrical Domestic Appliances Co., tubular suspension type, 100 W, 10s.; L. G. Hawkins, lamp type, "Peter the Heater," 25s.

Self-contained car-washing equipments are produced by Mann Egerton & Co., Ltd., (Roloid Rotor Junior from £27 10s.), the Power Plant Co., Ltd. (Chevroe, £14 17s. 6d.), and the Laycock Engineering Co. (£36).

Fans

Of a wide range of "Efesca" fans the "Invicta" convertible desk and bracket type, with a swivel and trunnion and 8-in. blades, costs 32s. (27 W a.c., and 19 W d.c., 1,350 r.p.m.); the "Antartic" non-oscillating type with 10-in. blades, priced at £2 (1,700 r.p.m., 30 W); and the "Ideal," with 8½-in. blades, costs 28s. The "Antartic" swivel and trunnion

A G.E.C. pumping outfit

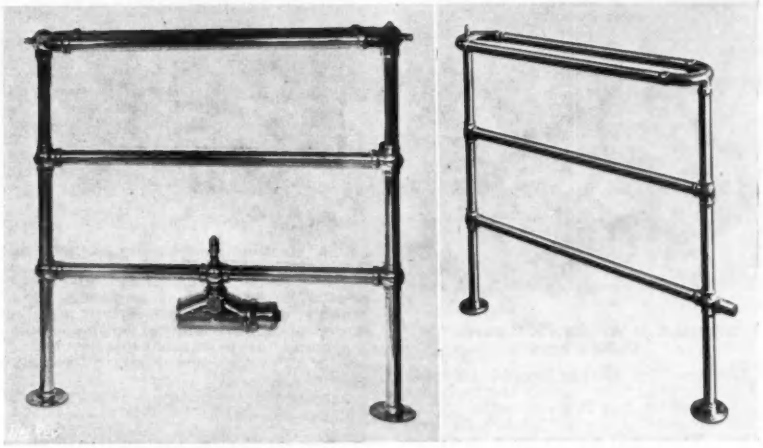
non-oscillating type costs from 62s. to 79s. (d.c.), and 66s. to 87s., according to voltage and whether 12 or 16-in. blades are used. The oscillating type costs 67s., 90s., or 110s. (d.c.), and 68s., 96s., and 112s. (a.c.), according to whether the size of the blade is 10, 12, or 16 in. Revolving ceiling fans cost 90s. with 12-in. blades and 109s. with 16-in. blades. (Prices for a.c. about 10s. more.)

The Cooper-Stewart Engineering Co., Ltd., make table fans from £2 5s. (10-in. blade) to £4 7s. 6d. (16-in.); swivel fans from £2 5s. (10-in. blade) to £4 12s. 6d. (16-in. blade); oscillating fans from £4 (10-in.) to £6 5s. (16-in.), and adjustable oscillating models from £4 5s. (10 in.), to £6 12s. 6d. (16 in.). Prices are for d.c. models; a.c. models are generally slightly cheaper, and universal models dearer. Porthole fans cost from £2 15s.; ceiling fans from £2 10s.; lampholder fans from £1 12s. 6d., and revolving ceiling fans from £6 10s.

Hogan & Wardrop, Ltd., supply a fan weighing only 1¼ lb. with a universal motor (25 W) which is claimed to be free from vibration, costing 32s. The "Sunairo" fan (Sun Electrical Co., Ltd.), has blades 8 in. in diameter, and is of the swivel and trunnion type. Loading (d.c.) is 19 W at 1,350 r.p.m., and

the price of the machine is £1 12s.

Fans produced by the British Thomson-Houston Co., Ltd., and sold by the Edison Swan Electric Co., Ltd., include an 8-in. model with self-lubricating and self-aligning sleeve bearings. It runs at 1,800 r.p.m., and the loading is 20 to 25 W. A feature is the "snake skin" finish. Verity's, Ltd., are also fan makers, while the "Magnet" (G.E.C.) oscillating fans are supplied with 12-in. blades from £4 12s. and with 16-in. blades from £5 2s. The ordinary table bracket type costs £3 6s. (12-in. blades) and £3 16s. (16-in. blades). Ceiling type fans with a sweep of 24 to 58 in., are available.



A Benham towel rail

A "Genii" equipment

Floor Polishers

The "Magnet" floor polisher, costing 12 gns., is supplied with two sets of brushes (one for the wax and one for polishing), and suitable for either d.c. or a.c. (25-60 cycles), 200 W. Similarly the "Electrolux" polisher has two sets of brushes, instantly detachable and changeable. When in operation three circular brushes revolve in two directions simultaneously at 750 r.p.m. The "Hobby," the smaller of the two models produced by R. G. Dixon & Co., Ltd., is designed specially for home use.

A floor-scrubbing and drying machine produced by Modern Domestic Equipment has its motor surrounded by a cylinder which contains the scrubbing liquid and forms a water-cooling jacket. This firm also makes floor polishers and waxers. The "Ediswan" electric floor polisher, "Duplex 75," weighs 23 lb. and costs £12 10s.; loading 360 W.

The "Electro Kindler," produced by H. M. Speirs & Co., blows a steady stream of hot air into the fireplace for kindling a coal fire; £4 10s. We hope that users of the electric gas lighter sold by the Ever Ready Co. (Gt. Britain), Ltd., at 5s., will regard the best lighting medium as a step towards the best cooking and heating medium.

Type C fire-extinguisher produced by Minimax, Ltd., is intended specially for electricity users by virtue of the extinguishing medium being non-conducting. It holds 2 pints and in polished brass it costs £2 15s.

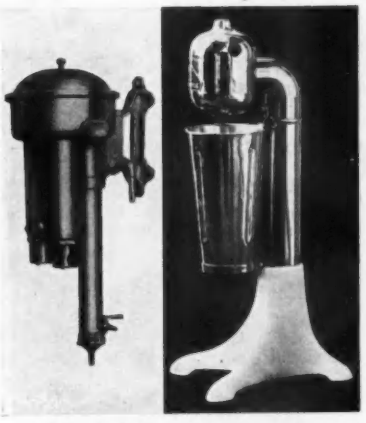
Siemens-Schuckert productions include a drink shaker (50 W) and an electric sewing machine equipped with a small lamp served by a focusing reflector.

The "Icall" curling-iron stove has two-heat control, weighs 2 lb. 5 oz., and costs £1 13s. A similar "Magnet" device loaded at 80 W costs £1 17s. 6d., while a shaving pot by the same company holds ¼ pint, is loaded at 300 W, and costs 25s.

A tie press marketed by L. G. Hawkins, Ltd., is loaded at 50 W and is sold at 7s. 6d.

An electric coffee mill produced by the Whitmee Engineering Co., Ltd., is driven by a ¼-h.p. motor, measures 16 by 15 by 29½ in. overall, and costs £21

Henley soldering iron (above)
"Efesca" curling-tong heater



A "T. & C." water still

A Siemens-Schuckert drink mixer

Battery Co., Ltd.; Oldham & Son, Ltd.; and Hart Accumulator Co.; Pritchett & Gold & E.P.S. Co., Ltd.; Wm. Geipel, Ltd.

The "All-in-One" bell, with the battery incorporated in the "Bakelite" case, and the "Eltron" immersion heater are products of Messrs. "Gadgets." A bellringer transformer is produced by Messrs. Ferranti, Ltd., at 7s. 6d.

The "Davenset Auto Charger" produced by Partridge, Wilson & Co., is a self-contained equipment expressly designed for recharging motor-car starter batteries for a.c. mains. Complete, it costs £8 7s. 6d.

A recent product of the Cressall Manufacturing Co. is a portable resistance for home cinema projectors. It is supplied in nine sizes, 300 to 1,500 W, 24s. to 60s.

Two introductions by The Dowsing Radiant Heat Co., Ltd., are a cigarette lighter (100 W) at 10s. 6d. and a hot-blade sealing wax heater (70 W) at 38s. 6d.

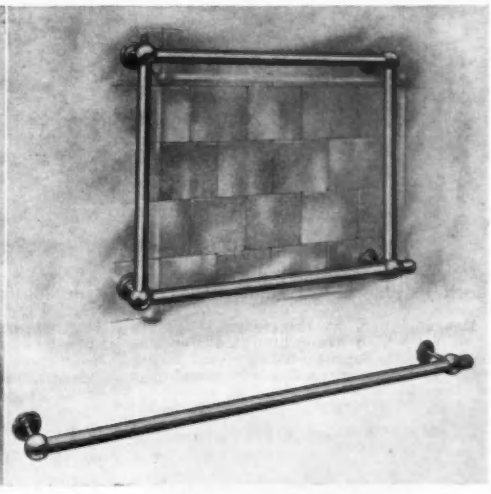
An immersion heater of the loop type is sold by Ward & Goldstone, Ltd., in three sizes, from 300 W, 6½ in., 6s. More or less local heating products of the same company are the "Mepic" shop window heater, 33 in. long, 21s., and the car radiator heater of the same name 21s. 6d. The "Cozytowz" foot warmer, suitable for a 6 or 12-V accumulator, costs 20s.

The "Ediswan" car and room heater has a perforated tube body, weighs 4¼ lb., is loaded at 350 W, and is priced at £1. There is available at £1 15s. a 500-W "Magnet" bed warmer.

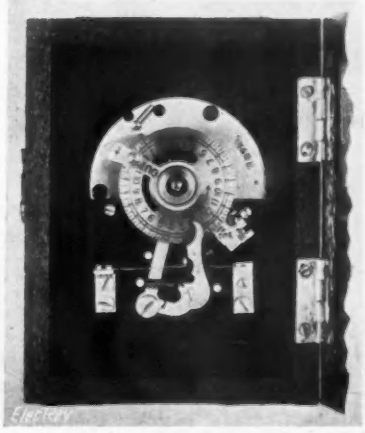
Stokes automatic water stills are produced by Thompson & Capper, Ltd., in two sizes—2½ and 1 gallon—loaded at 9,000 and 3,000 W. They are fitted with endurable electric heating units.

It is difficult to denne the line between batteries for domestic and other uses, but within the range of products of the following companies there are many models of interest to domestic consumers: Britannia Batteries, Ltd.; the Fuller Accumulator Co., Ltd.; the Chloride Electrical Storage Co., Ltd.; Ever Ready Co. (Gt. Britain), Ltd.; British Battery Co., Ltd.; Fuller Accumulator Co. (1926), Ltd.; Siemens Brothers & Co., Ltd.; Pertrix, Ltd.; D. P. Battery Co., Ltd.; Atlas Carbon Battery Co., Ltd.; Tudor Accumulator Co., Ltd.; Le Carbone, Ltd.; Premier Accumulator Co.; British Insulated Cables, Ltd.; Alton

The Dixon floor polisher



"Gee-Gee" towel rails



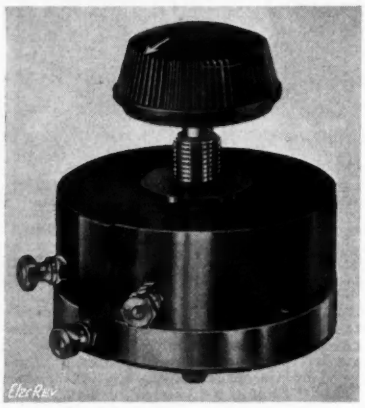
A Venner domestic time switch

Section XI.—Radio Apparatus

Electricity's contribution to entertainment

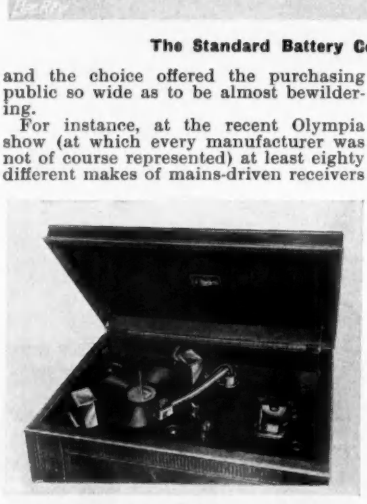
Nearly five million homes are equipped with licensed receiving apparatus, which means that quite half the population of the British Isles derives regular entertainment from the service, but there is still tremendous scope for the sale of sets

REASONABLE fidelity of reproduction combined with simplicity of operation are expected to-day and are, on the whole, available. In reproductive capabilities very material improvements have been achieved, musically as well as technically. Indeed the general standard of excellence is so high and the choice offered the purchasing public so wide as to be almost bewildering.



The Varley wire-wound volume controller

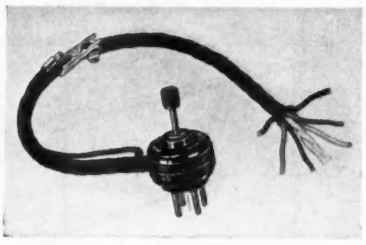
For instance, at the recent Olympia show (at which every manufacturer was not of course represented) at least eighty different makes of mains-driven receivers were on view. Regular listeners whose experience has taught them the wisdom of being content with good reproduction of British programmes and a modest selection of Continental ones have therefore a wide enough range of two- to four-valve sets from which to choose. A.c. receivers predominate, of course, but the number of d.c. instruments has increased of late.



The Marconiphone radio-gramophone

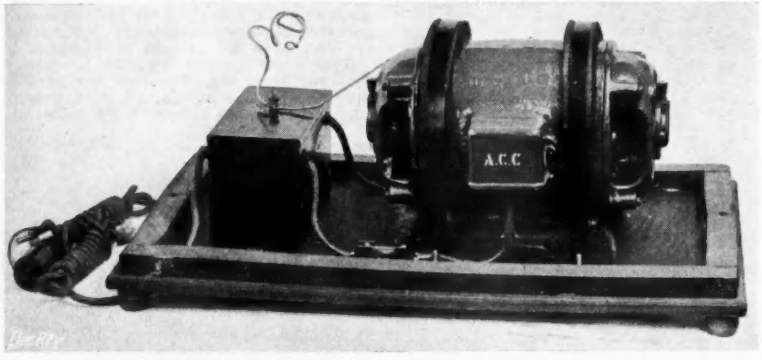
The better known sets include the "H.M.V.," "Marconiphone," "Gecophone," "Standard," "R.I.," "Kolster-Brandes," "Blue Spot," "Columbia," "Pye," "Lissen," "Ekco," "Lotus," "Murphy," "Philips," "Telsen," "McMichael," "M.A.P.," "Zetavox," "Ferranti," "Gambrell," and "Brownie," the last mentioned being very modestly priced.

To search the ether for all and every transmission necessitates the use of more complicated sets and enthusiasts who are not satisfied with the capabilities of straightforward instruments, have a further choice of superheterodynes, of which twenty-five makes were on view at the Radio Show.



Automatic Coil Winder Co. "Avodapter" testing plug

Last year the listener beyond the reach of public electricity supply mains had a real grievance, but this season he will be able to select from at least forty-three makes. There will always be a demand for battery-operated sets, even when the availability of electricity becomes general. Accumulators and dry batteries are obtainable from nineteen sources and for the conversion of such sets for mains operation battery eliminators of seventeen different makes can be supplied.



The Standard Battery Co.'s (Wates) rotary convertor

Valves and Loud Speakers

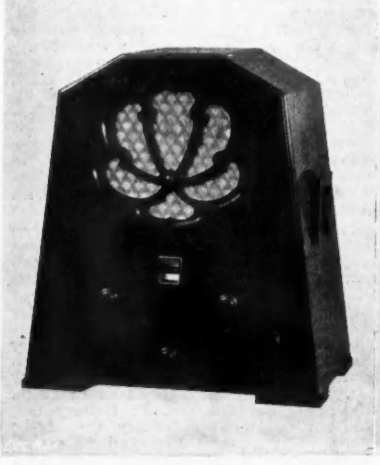
There are over a dozen makers of valves and not fewer than forty-five firms produce loud speakers of different kinds. They are now usually built in the receiver cabinet, but performance cannot infrequently be materially improved by keeping the two instruments entirely separate. The smaller reproducers are, broadly, of the moving-iron type and the larger ones have mains-energised moving coils; the permanent-magnet variety of the latter type has developed remarkably of late.

A Westinghouse battery charger

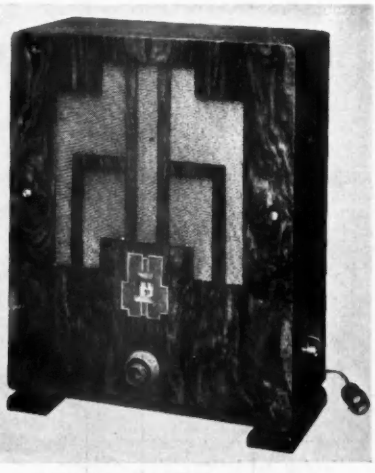
Among the good class instruments are the B.T.-H. ("R.K."), "Slektun," "Celestion," "Amplion," "Igranic," and "Ormond," besides set makers' types mentioned above.

Mains-driven receivers permit the use of large valves and large loud speakers. Powerful reproducers built into the set cabinet have, however, added to the valve makers' problems, for such a speaker is within a few inches of the sensitive valves to which its vibration can easily be transmitted. To minimise such interference with inter-electrode capacity the "rigid unit" method of construction, which provides extra sup-

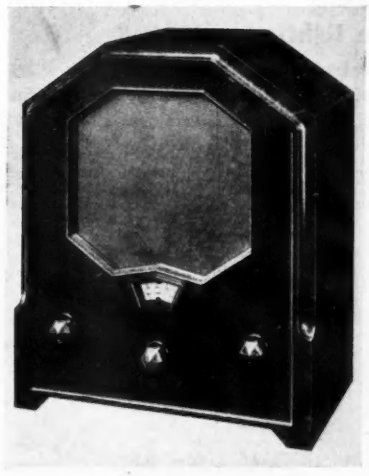
The R.I. super-het. receiver



The Ferranti super-het. consolette



The Standard T. & C. receiver



A "Gecophone" receiver

port for the electrodes, has been applied to the full range of the Mullard Wireless Service Co., Ltd.

Thermionic valve manufacture is being continually developed, resulting in better performance, improved constancy of

A Partridge Wilson mains transformer

characteristics, and lower prices. Other established makes include the "Marconi," "Osram," "Mazda," "Ediswan," "Cossor," "Philips," and "Six-Sixty," while the "Ferranti" and "Standard" are more recent introductions.

Portable Sets and Gramophones

Portable receivers, of which twenty-two makes were exhibited, have their special uses; crystal sets are still to be had, though rarely asked for now, and complete kits of parts are offered by twelve makers for home assembly. Short-wave receivers are becoming more readily available commercially (six makes and two kits) apart from seventeen makers who provide adaptors and components for converting normal sets, a few of which are now being designed for the reception of all three long, medium, and short wave bands.

There has also been quite considerable radio-gramophone development; some forty-one makes are in the market, while most receivers provide for the easy connection of gramophone pick-ups.

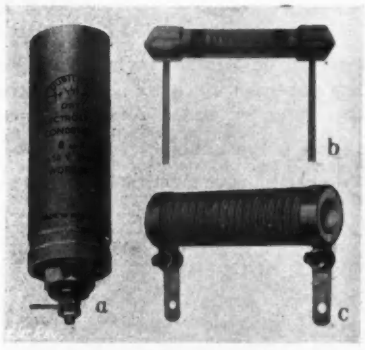
Improvements in receiver performance have naturally resulted from the better design and workmanship put into component parts, whose manufacturers include J. J. Eastick, the London Electric Wire Co., Partridge, Wilson & Co., Igranic, Bulgin, Ferranti, Junit, Lissen,

Chloride batteries

Peto-Scott, R. I., Varley (Oliver Pell), Watmel, Formo, Gambrell, Ormond, Telegraph Condenser Co., Belling & Lee, Concordia, Ediswan, Westinghouse, Wilkins & Wright, Benjamin, Burne-Jones, McLeod, and others.

Domestically the more important Heayberd products are battery eliminators, mains and auto-transformers. Dubilier anti-interference devices, condensers, chokes, metallised resistances, r.c.c. units, and the "Dacon," which enables the house wiring to be used as an aerial, are well known. Besides receivers, Lœwe components include vacuum resistances in glass tubes and multiple valves in single bulbs.

"Blue Spot" speakers and driving units have a good record; wave traps and mains disturbance eliminators are made, also, beside receivers, Partridge Wilson battery-charging equipment and "Davenset" mains transformers and smoothing chokes are well designed. Dyson battery eliminators, trickle chargers, and rectifiers are made for portable and stationary sets under the name of "Godwinex."

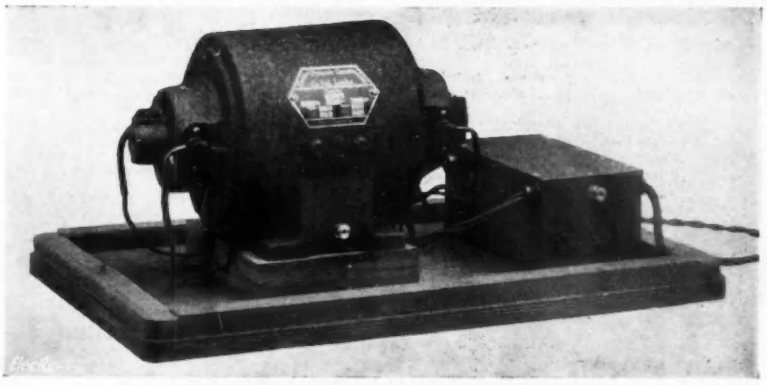


Dubilier products: (a) high-voltage electrolytic condenser; (b) metallised grid leak; (c) "Spirohm" resistance

Radio-gramophone components of Harlie make include pick-ups, tone selectors, adaptors, scratch filters, &c., and the Carborundum Co. makes crystal detectors, resistances, grid leaks, and r.c.c units.

Rotary convertors for operating a.c. receivers from d.c. mains are obtainable from the Electro Dynamic Construction Co., Ltd., Standard Battery Co. (Wates), and L. McMichael, Ltd., the last-named firm's receivers including a twin-speaker radio gramophone for home or concert use.

The Univolt Electric, Ltd., unit will instantly convert a radio set into a radio-gramophone. It is completely self-contained within a "Bakelite" base of compact dimensions. The overall depth of the unit itself is under 2 in., and it requires no mounting or fixing.



An Electro Dynamic rotary convertor

A new R.I. short-wave convertor has been developed for use in conjunction with any existing a.c. mains-operated receiver. This is entirely mains operated and obviates the necessity of removing any of the valves or of obtaining access to the interior of the receiver, all connections being made externally in the simplest possible manner.

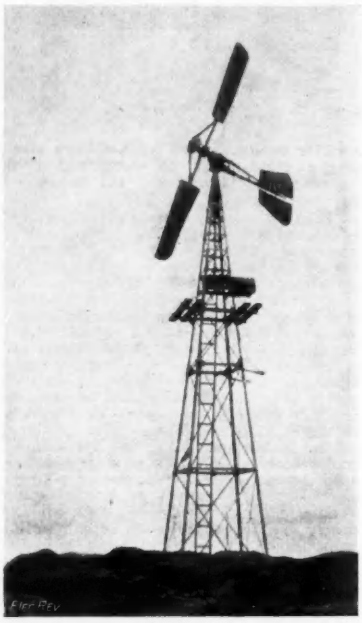
Two "Northmet" items (see p. 574): The new Edmonton showrooms and the company's stand at the North London Exhibition

Section XII.—Generating Sets

The equipment available for country-house lighting

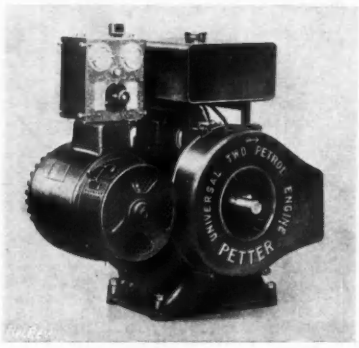
There will no doubt always be a field for business in small generating equipments, usually termed house-lighting sets, for apart from personal prejudices and the question of how soon public supplies will be available in some of the outlying rural areas in the country, the claims of economy made by the manufacturers of small internal combustion engines must be taken into account

IN the following notes we have endeavoured to indicate very briefly what classes of equipment are available, confining our attention chiefly to the self-contained sets, *i.e.*, those in which the driving unit and generator are built up as one outfit on a common bedplate.



Windmill set (Glasgow Elec. Eng. Co.)

Petters, Ltd., make a 1-kW air-cooled set with the dynamo bolted to the 2-h.p. petrol engine. The output is 14 A at 50/70 V and 2,200 r.p.m. Other "Petter-Light" models are No. 101, 1½ h.p., 50/70 V, 750 W; No. 101 A, 1½ h.p., 50/70 V, 750 W; No. 102, 3 h.p., 50/70 V, 1,250 W;



A "Petter-Light" with outboard generator

No. 102 A, for 15 40-W lamps; No. 103, 18 lamps; No. 103A, 25 lamps; No. 104, 18 lamps; and No. 104 A, 31 lamps. The following models have dynamos directly coupled to the engine shafts: No. 2, 1,000 W; Nos. 3 and 3A, 1,500 W; Nos. 5 and 5A, 3,000 W; No. 6, 3,500 W; No. 7 5,000 W. The "A" models have a larger battery incorporated.

Sets Nos. 2 to 5A have paraffin or petrol engines; No. 7 has a surface-ignition engine and No. 6 an "Atomic Diesel" engine. Similar sets of 2, 3½, 6, 7 and 9 h.p. are made without switchboards or storage batteries. There is also a range of 4 h.p. (2 kW) electric lighting sets with air-cooled petrol engines and dynamos coupled directly to the engine shafts with or without storage batteries.

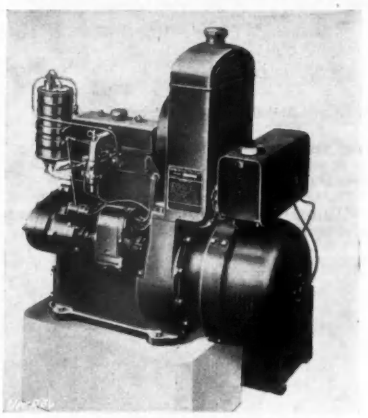
Automatic lighting sets of the floating battery type with air-cooled petrol engines are also available in sizes of either 2 or 4 h.p. Blackstone & Co., Ltd., produce 1, 1½, 2½, and 3½-kW sets in which the driving unit is a water-cooled petrol engine. There is also a range of 1, 1½, 2½ and 3-kW kerosene sets.

Ruston & Hornsby, Ltd., make a totally enclosed petrol-started paraffin engine specially designed for dynamo driving in sizes of 1½, 2, 3, 4½ and 6½ b.h.p.

The Kohler automatic model "S" has an output of 800 W at 110 V, d.c., with a 1¾-h.p. air-cooled motor; model "T" is the same without the starting battery; model "SA" is for operation on town's gas; model "TA" for hand starting and operating on the town's gas; while models "D," "E," "DA," and "EA" are similar, but have a 3½-h.p. motor giving an output of 1,500 W. Models "K," "L," "KA," and "LA" have 4½-h.p. motors, while others drive 5-kW and 10-kW machines.

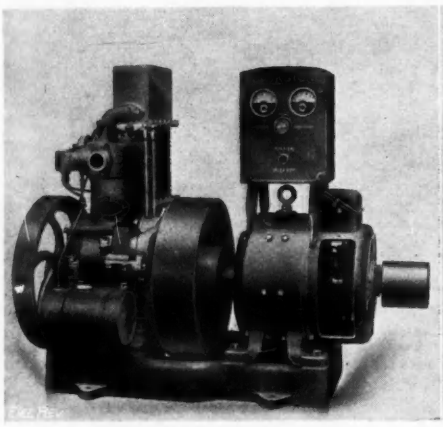
Crossley Brothers, Ltd., make lighting sets in three standard sizes, 1, 1½, and 3 kW, using water-cooled paraffin engines, but larger sizes can be supplied. Stuart Turner, Ltd., make a 150-W plant with a ½-h.p. engine, a 250-W model with a ⅝-h.p. engine, a 500-W model with a 1-h.p. engine, a 1-kW model (2-h.p. engine), and a 1,500-W type (3 h.p.).

Austinlite, Ltd., also make house lighting sets from ½ kW, 25 or 32 V, running on petrol; above 3 kW crude oil is used. The Glasgow Electrical Engineering Co., Ltd., is marketing an interesting set which is wind driven, as well as petrol-paraffin and oil-engine-driven sets.

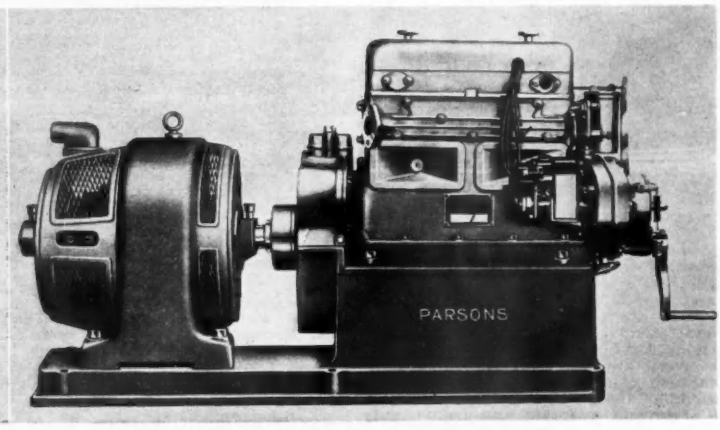


A Kohler equipment

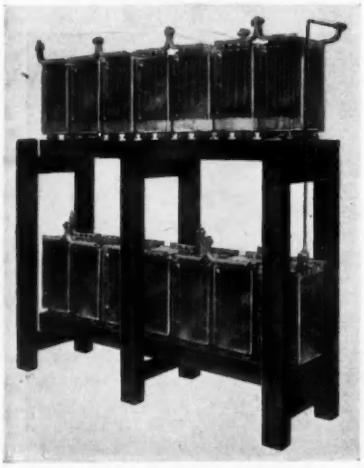
The Parsons Oil Engine Co., Ltd., makes an 18/20 water-cooled engine and dynamo plant. The "Electolight" automatic set supplied by Boulton & Paul, Ltd., is of the four-stroke water-cooled petrol-engine type with a detachable cylinder head. The engine is of 2 h.p. and the dynamo 1 kW. A 30-A set costs £75 without a battery and £92 17s. complete with a 40-Ah battery.



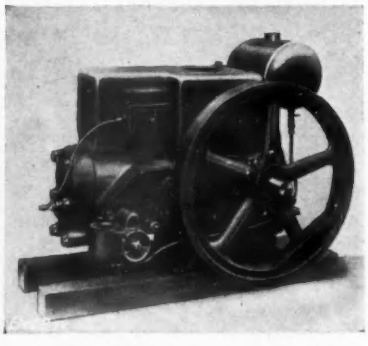
A Blackstone combination



A complete outfit by the Parsons Oil Engine Co.



A Chloride battery installation



A Ruston & Hornsby paraffin engine

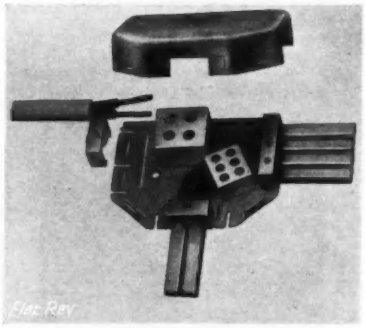
Section XII.—Installation Materials

A guide to wiring systems and accessories

Probably in no other field has such ingenuity been exercised as in the provision of wiring, switching and fusing arrangements; with such a wide range available there is no reason why installations should not be convenient and safe in every way

THIS section is divided broadly into systems designed to make installation work simple and sound and accessories to secure safe operation, combined with convenience.

The following companies participate in the standardisation scheme for wiring initiated by the Cable Research Committee: British Insulated Cables, Ltd.; Callender's Cable & Construction Co., Ltd.; Enfield Works, Ltd.; W. T. Glover & Co., Ltd.; W. T. Henley's Telegraph Works Co., Ltd.; the Macintosh Cable Co.,



C.R. wiring system tee box

Ltd.; the St. Helens Cable Co., Ltd.; and the Union Cable Co., Ltd. The scheme provides three actual wiring systems for use with lead-sheathed cables, similar cables, but with a continuous bonding wire under and in direct contact with the lead, and c.t.s. type cable. Each company markets the systems in conjunction with its own particular makes of cables, but all the systems are identical apart from this.

Joint boxes for the metal-sheathed system have only three component parts—back plate, cover, and bonding clamps. Jointing is by porcelain-sheathed connectors. The covers snap on and are slotted to take up to 3/.029 in. twin cables. A small straight-through box for one flat twin cable up to 7/.036 in. costs 9d., and a small tee box 10½d. A large universal box for up to three flat twin 3/.029 in. cables costs 1s. 9d. A clamp for a large tee box is priced at 3d., and universal bonding clamps for use at any or all of the four points of entry cost 45s. per hundred.

Bonding bars for up to twelve cables cost 1s. each, and fixing clips and saddles up to 2s. 3d. and 4s. per hundred. The accessories for the bonding wire system are similar, although simpler, because of the absence of bonding clamps, etc. A straight-through box costs 1s., a large tee box 1s. 7½d., small and large universal boxes 1s. 3d. and 1s. 9d., and a continuity bar costs 6d.

The c.t.s. system is simple and employs "Bakelite" boxes with rigidly moulded-in terminals, the cable entries being ar-

"Seelco" conduit adaptor

A G.E.C. two-way lampholder

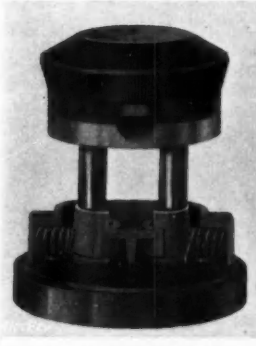
ranged with small open spaces and filleted sides. A straight-through box costs 9d., a three- or four-way box 1s. 6d., a tee box 1s. 3d., and steel protective covering up to 2s. per six-foot length.

Some of the manufacturers concerned produce their own systems. The Callender "Kalibond," "Kaleeco," and c.t.s. wiring systems are very similar to the standardised one, but the "Prescot" wiring system (B.I.C.) provides for the use of the company's twin house wire in conjunction with lead sleeve joints, or boxes of cast metal split longitudinally into halves, jointing of the wires being effected by brass connectors enclosed in porcelain carriers. Single- and double-way straight-through boxes cost up to 70s. and 115s. per dozen, single-way tee boxes up to 90s. per dozen. Straight-through one- and two-way boxes cost about the same as the single-way tee boxes, and sealing ends up to 110s. per dozen. Bases for ceiling roses, &c., cost up to 30s. per dozen, while a distribution box with five branches is priced £4 10s.

Accessories for the "Stannos" wiring system (Siemens) include buckle clips at from 1s. 6d. per gross, butterfly clips at up to 7s. per gross, cushion clips up to 16s. 6d. per gross, "Twiston" connectors for return current connections on to the sheathing up to 42s. per gross, continuity bus-bars up to 4s. per sixteen way, and teak and iron fuseboards. A 12-way d.p. ironclad fuseboard costs 38s.

Junction boxes for the "Seelco" wiring system (Siemens) cost 19s. 6d., 15s. 9d., 17s. 3d., 28s. 6d. and 18s. 9d., for the small universal straight-through and tee models, and the large universal and tee types, respectively. A conduit adaptor, consisting of a brass gland, screwed at the base, and a cone which fits into a knurled cap, forming a stuffing gland, costs, for ¾-in. conduit, 18s. per dozen.

The accessories produced by Johnson & Phillips, Ltd., for use with the three types



The "Wylex" switch plug

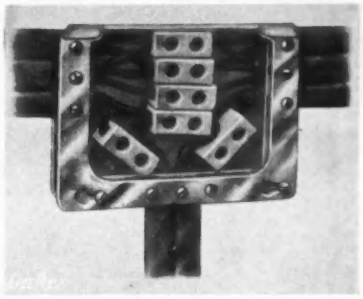
M.K. cooker control unit

of wiring are simple and few in number. The joint boxes for the metal-sheathed and metal-sheathed with bonding wire systems are the same, except for the actual bonding arrangements. The 3-way boxes cost 10s. 6d. per dozen. Small 4-way and universal 4-way boxes cost 30s. per dozen. The joint box for c.t.s. type cable is made in one size only in "Bakelite." It is round and neat and costs 18s. per dozen. Bonding rings cost 8s. per dozen, and bus-bars 7s. and 8s. 6d. per dozen.

A feature of the "Goltone" connecting box produced for c.t.s. wiring is the large terminals provided. It will take several 7/20 conductors, and it is sold at 1s. 3d.

Features of the "Tenby" wiring system for metal-sheathed cables, produced by S. O. Bowker, Ltd., are: the "Universal" junction box, 4-way, 3 in. by 3 in., 17s. 3d. per dozen; the straight-through box at 13s. 9d. and the tee box at 14s. 3d., both 2½ in. by 2 in.; the large 4-way "Universal" junction box, 3½ in. by 3½ in. at 24s.; and a large tee box, 3½ in. by 2½ in., 16s. 9d. The "Tenby" bonding plate (8s. 6d. per dozen) and bonding cup (14s. 6d. per dozen) are designed to ensure "that the metallic projection of the cable shall be brought through to the surface of the wall or ceiling." For the c.t.s. type cable there is a circular "Bakelite" junction box 3 in. in diameter, which sells at 15s. per dozen; a 2½-in. box at 12s.; and a "Bakelite" ceiling rose at from 8s.

The "Lecite" wiring systems produced by the Liverpool Electric Cable Co., Ltd., serve for non-metal and metal-sheathed cables. For use with the former there are, *inter alia*, 4-way junction boxes (circular from 14s. 9d. per dozen and square

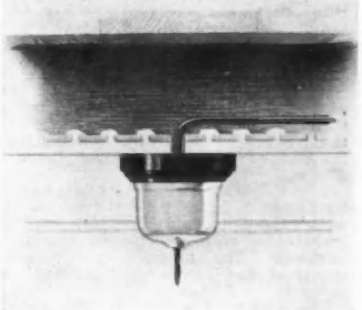


Tee box for Callender's wiring system

18s.), and a 3-way box at 16s. 6d., a 3-way tee box at 15s., ceiling rose 16s. 6d., and a plug and socket at 18s., all in "Bakelite." Accessories for the metal-sheathed system include a junction box suitable for two 1/0.044 flat twin or one 7/0.029 flat 3-core cable per way at 18s. per dozen, and another suitable for two 7/0.029 flat twin or one 7/0.044 flat 3-core cables per way at 27s. per dozen; one-way bonding bars at 18s. per gross; and earthing terminals at 21s. per gross.

The following notes refer to a few of the special cables that are marketed nowadays as flexible leads for portable electrical appliances. "Thermoid" cord (Henleys) is supplied in various types as twin and three-core, some with flame-resisting braiding and others asbestos served. Twin circular asbestos-served cord costs £2 16s. per 100 yds. Henley domestic tape finds many uses, such as repairing radiator connections, etc.

"Ankaflex" is a Callender production which has a heald cord which should be tied to the plug, etc. "Supaflex" (B.I.C.) contains cords laid up with the cores to give additional strength. "Rockbestos" (B.I.C.) heater cord has a special heat-insulating material over



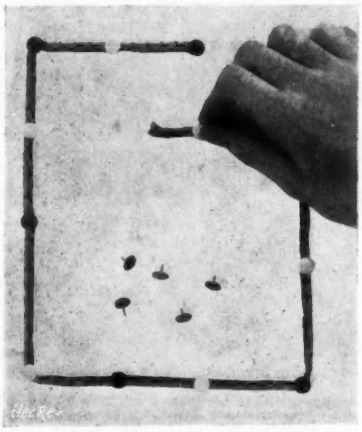
A Johnson & Phillips ceiling rose

the ordinary conductor insulation. Hart Bros. Electrical Manufacturing Co., Ltd., produce "Harbros," consisting of two 14/36 s.w.g. single v.i.r. conductors under one silk covering with a centre webbing between them, so that it can be fixed directly by suitable pins, etc.

House Service and Distribution Equipment.

Although service equipment could not be dealt with fully in an article such as this, a review of domestic equipment could not be representative without touching on some of the equipments particularly adapted to domestic installations.

The "Sandas" and "Sandasplit" all-insulated d.p. switch-fuse and two-way



"Harbrós" wiring

d.p. switch-fuse with 10-A circuits and 20-A mains are produced by Wm. Sanders and Co. at 4s. and 6s. each, respectively. Included in the range of equipment produced by the Midland Electric Manufacturing Co., Ltd., are the "Memset," a d.p. main switch and a two-way d.p. fuseboard, self contained, in an iron case, 15- and 30-A sizes. The "Memdix," a small d.p. combined switch and fuse with a push-and-pull action, constructed in a solid block of porcelain with a "Bakelite" knob; the "Duette," a small and neat two-way 5-A distribution board; the "Mem 8," a combined d.p. switch and fuses, the working parts of which are mounted in a heavy porcelain base with a black cover and handle in "Bakelite."

Ironclad service cut-outs with ceiling chambers are produced by Messrs. Prentice, Ltd., in 2-, 3-, and 4-pole, as well as s.p. and neutral-link, and 3-pole and neutral-link types, in capacities from 30- to 60-A at from 8s. 8d. to 34s. Closely related to this there is the "Esften" 15-A combined switch and fuses at 5s. The "Newera" switch fuse, a compact q. m. and b. d.p. unit of porcelain in iron (4s. 4d.), is representative of a fairly wide range of switch fuses, including also the "York," which is available in from 20- to 120-A sizes, both d.p. and t.p.; a 20-A d.p. model costs 10s. Distribution boards vary in price from 3s. 10d. for the two-way 5- to 10-A type M with a china base and wood cover, to the "Prentex" H.O. t.p. ironclad 8-way 120-A fuse board, which is listed at £20 8s.

The "Hous" switch-fuse is produced by Berry's Electric, Ltd., at from 7s. (d.p. switch-fuse, bushed) to 16s. 6d. (t.p. switch-fuse with four fuses, conduit or bushed). The outside case measurements of the last-named "splitter" are 8¾ by 6¾ by 3 in.

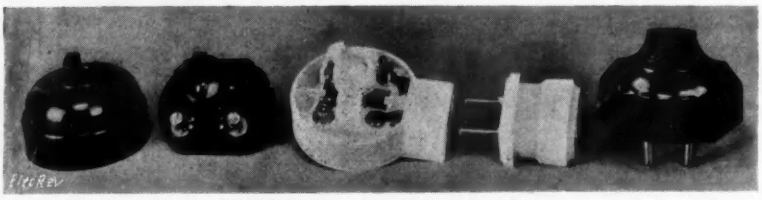
The Foster Engineering Co., Ltd., is marketing the "Apex 1010" all-insulated switch-fuse—the fuse (1½ in. long) is enclosed in an asbestos tube—to take 10 A, 250-V single switches, 3s. 4d. each. The "Revo" switch-fuse for currents up to 30 A is listed at 10s., and the "Revette," up to 15 A, at 4s. each, while the 15-A "Splitter" switch and fuses cost 7s. 4d.

Wandsworth d.p. fuse boards (porcelain slabs in teak cases) are available in two- to twelve-way models for each of 5- and 15-A sizes, costing from 8s. to 33s. 4d., and from 9s. 2d. to 39s. 4d., respectively. They are made by the Wandsworth Electrical Mfg. Co., Ltd. J. A. Crabtree and Co., Ltd., make "Splitter" units, which include standard models of 20 to 25 A and 30 to 40 A, with bottom-tapped adapters, at 19s. 8d. and 30s. 8d., and "Pedigree" equipments—15-A, d.p., two-way and three-way units at 6s. 4d. and 9s. 8d. each. Other ironclad apparatus are the "Lincoln" 10- to 15-A cut-outs (s.p.), d.p. switches, d.p. switch-fuses, and the d.p. switch and fuse splitter units. A 15-A d.p. switch, 3¼ by 5 in., costs 3s. 4d.

Teak and iron-cased fuse boards in two to ten ways cost from 7s. 8d. to 22s., and from 7s. to 25s. 4d., 10 A, and from 9s. 4d. to 25s. 8d., and from 8s. to 29s., 15 A. A shockproof unit is the 10-A d.p. switch-fuse in "Jacelite." This is listed at 5s. 8d. An example of the ironclad switch splitter units carrying the "Telac" mark is that with three fuse ways and rated 30 A, with bushed top cable entries and undrilled conduits adapter at the bottom, it costs 22s. There are "Firth" and "Don" switches and switch fuses, service cut-outs, and multi-way fuse splitter boxes. The last-mentioned is available in two and three ways, and in four sizes from 10 to 60 A from 5s. 4d. to 16s. 8d., and 8s. to 24s. 8d. in each case. "Trent" s.p. ironclad service cut-outs may be purchased in 15-, 30-, 60-, and 100-A sizes for 250 V and 500 V with and without sealing chambers.

Five-, 15-, and 30-A teak boards with from two to twelve ways sold by Siemens Electric Lamps and Supplies, Ltd., cost from 5s. 4d. to 60s.; while ironclad boards of the two largest sizes cost from 11s. 8d. to 64s. Ironclad service switch fuses are priced at 5s. 8d. for the 15 A, and 5s. for the 5 to 10-A sizes.

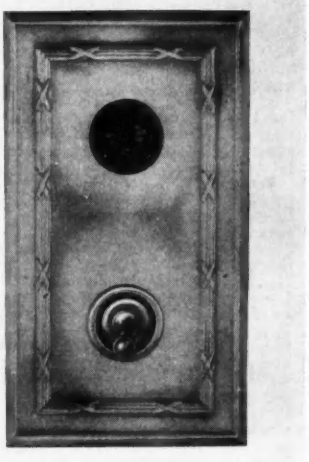
Miniature circuit breakers for use in place of fuses have made a little headway in this country. Five models of the thermal type are produced by Messrs. Allen West and Co., Ltd., for



A range of Becker products

normal loadings of from 3 to 5 A up to from 19 to 26 A.

Models sold in this country by Siemens-Schuckert (Great Britain) Ltd., are available in 20-A s.p. sizes for up to 250 V d.c. and 400 V a.c., and 15-A 2- and 3-pole sizes up to 250 V d.c. and 500 V a.c. Some



The "Elsico" switch indicator

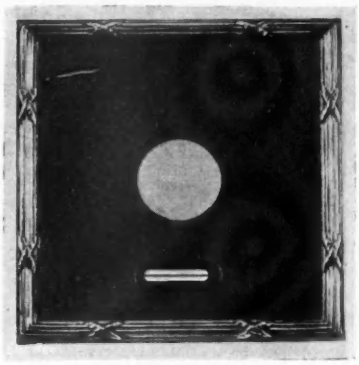
have magnetic overload release, some have thermal overload release with time lag or magnetic overload release without time lag, and others (2 and 3 p.) have overload release short-circuited when switching on.

Other breakers of this type available include the "Magnet" unit.

A range of reasonably priced miniature circuit breakers developed by Nalder Bros. & Thompson, Ltd., are made to carry 1, 3, 5, 10, 15, 20 or 25 A, and cost 10s. single-pole, £1 8s. double-pole, and £2 2s. triple-pole.

Small Switches

The bulk of the usual type of round wall switches produced by Messrs. J. H. Tucker & Co., Ltd., are in 5-, 10-, and 15-A ratings, including both the metal cover and all-insulated models for surface, semi-recess, and flush fixing, and embracing the "Spartan" and "Titan." The former, with its spring-operated contact roller, is all-insulated, and a 5-A surface model measures 2¼ by 1¼ in., and is listed at 10s. 4d. per dozen, brown on white. The 5-A "Titan" switch is avail-



The "Everlight"

able in surface and semi-recessed fashions also, and so is the 5-A "Twin-Titan," a compact rectangular equipment which embodies two one-way or one one-way and one two-way movements. It is all-insulated and a two one-way surface model, all brown, costs 28s. 6d per dozen.

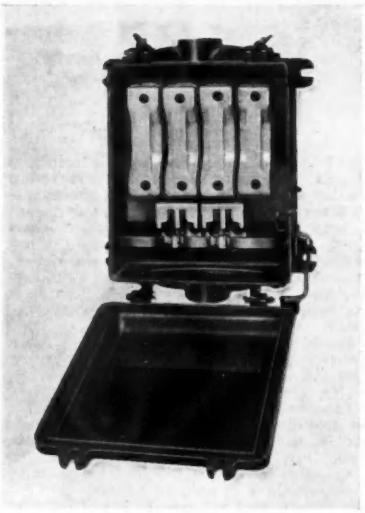
A solid-link switch in 5- and 10-A sizes with insulated covers and metal dollies or all-insulated is available in the surface and semi-recessed types, both as ordinary one-way and as intermediate switches. The 5-A flush switch is also available with this movement, a one-way model with "Kwikwire" terminals costing 15s. per dozen. Rated at 5 and 15 A q.m. and b. models are available as single-pole surface, d.p. on single base surface, and similarly as semi-recessed and flush switches. Both solid-link and q.m. and b. movements are available in 5, 10 and 15 A, d.p. coupled surface and semi-recessed models.

Five- and 10-A flush switches may be obtained with toggle action, a one-way 5-A model with top screw terminals costing 15s. per dozen. A 5-A intermediate flush switch is available with the q.m. and b. movement, which has also been incorporated in the makers' "Sincord" ceiling switch, which, in its semi-recessed one-way form, with a metal cover, costs 38s. per dozen, nickel-plated on white, The luminous dolly feature is applicable to any 5-A tumbler switch. For use with flush switches there is a wide range of "Telacite" plates. Wood blocks for semi-recessed switches in various woods and numbers and arrangements of ways are also "Telac" products. Ten-A four-way oblong blocks, 1 in. thick, 12⅜ by 3⅜ in., white enamel, cost 25s. per dozen.

A range of switches produced by Messrs. Marbourn, Ltd., includes 5-A link-action and q.m. and b. switches in surface, semi-recessed and flush types, with metal covers and all-insulated, both one-way and two-way, and also d.p. coupled, unmounted. A one-way link-action surface switch, with a polished brass cover, costs 7s. 6d. per dozen, while a two-way "Bakelite" cover link-flush switch without rings is listed at 13s. 9d. per dozen, and a semi-recessed "Pozquik" (q.m. and b.) brown shock-proof switch costs 11s. 1d. per dozen. Link-action 15-A s.p. switches, with polished brass covers, cost 17s. 11d. per dozen; while 15-A s.p. and d.p., unmounted, q.m. and b. units, cost 22s. 6d. per dozen for the former in shock-proof style, brown on cream, and 43s. 9d. per dozen for the latter, with polished brass cover.

Many of what might be termed special-purpose switches are to be seen marked "Lektrik," the trade name of A. P. Lundberg & Sons, Ltd. The "Duplex" switch, with its three knob positions, is available in 3, 5 and 10-A ratings, and in surface, semi-recessed and flush patterns. The 5-A surface pattern is 2¼ in. in diameter, and listed at 42s. per dozen, flat brass on cream. "Kilarc" tumblers, in single- and two-way types, surface and flush patterns, are available in 15-A ratings at 60s. per dozen.

The "Marvel" switch affords an improvement on the ordinary two-position control, in that it provides two-way control for one lamp and ordinary switching for a second lamp. In brown "Bakelite," the two-way model costs 39s. per dozen. Intermediate 3-, 5-, and 15-A switches in semi-recessed, surface and flush patterns embody the "Kilarc" q.m. and b. movement, while "Pivot" (q.b. movement) is available in surface, semi-recessed and flush types, single and two-way. A surface switch has a base diameter of 2¼ in. and is priced 24s. per dozen, one-way. Flush 5-A tumbler switches in single-



Berry's Electric "Hous" unit

way, "Twinob," d.p., two-way, two-way and off, intermediate, &c., with q.b. and q.m.b. movements, are priced at from 21s. to 51s. per dozen, and 10-, 15- and 20-A flush switches from 39s. to 124s. per dozen.

Secret key switches are another feature of this make, and are produced in ratings

An M.E.M. product

of 5 A for surface, semi-recessed and flush types, and 10 A for surface and flush types. A 5-A two-way surface model has a base diameter of 2¼ in. and costs 43s. 6d. per dozen. The "London" underslung, rated at 5 A, is available in the three styles of fixing and single and two-way. The two-way surface list price is 28s. 6d. per dozen.

Under the names "Landor" (underslung, q.m. and b.) and "Slick" (q.b., link), there are two comprehensive ranges of switches produced by the General Electric Co., Ltd. In surface and semi-recessed types there is the 3/5-A "Landor Junior" with fixed cover and all-insulated. The 5-A two-way surface "Landor" has a 2¼-in. base dia., and 1⅛-in. projection, and with a polished-brass cover on cream it costs £1 4s. 4d. per doz. The one-way surface 5/8-A all-insulated model, brown on cream, costs 15s. 4d. per doz.

In one- and two-way styles, 5 to 8 A

Ward & Goldstone accessories

and 5 A, respectively, semi-recessed models, have an under flange diameter of 2 1/16 in., and a one-way all-insulated switch is listed at 17s. 2d. per dozen, all brown. Flush switches are similarly rated and have a base diameter of 2 in. A two-way metal-dolly unit, polished brass, costs 26s. 4d. Earthed surface, semi-recessed and flush types are available at similar ratings, while there are one-way 5 to 8-A switches with loop-in terminals, and 5-A intermediate switches in surface and flush patterns. The "Landor" movement is also incorporated in a number of special switches. Rated at 15 A d.p. single-base all-insulated surface and d.p. coupled metal-cover switches are priced £3 12s. and £4 4s. (unmounted) per dozen.

The "Slick" range covers almost similar types, ratings, dimensions, etc., except that the prices throughout are a little lower: e.g., the two-way model with a polished brass cover on a cream base is listed at £1 per dozen, as against £1 4s. 4d. for the corresponding "Landor" switch. The "Deeble Slick" has a slotted base interior and interior terminals, so that the connections can be made after the switch is fixed. The one-way brown all-insulated surface model costs 14s. 4d. per dozen.

With underslung, q.m. and b., and link actions a wide variety of switches is produced by the Wandsworth Electrical Mfg. Co., Ltd. A one-way surface switch with brass links and a metal cover costs 12s. 8d. a dozen, and the similar semi-recessed model is listed at 1s. 4d. per dozen extra. Quick m. and b. "Slot" switches are available in shockproof style only; the all-brown one-way models costing 12s. 4d. per dozen, and the all-white two-way models 24s.

The underslung apparatus covers all three fixing styles in 5- and 15-A ratings, for both metal-covered and all-insulated switches. A 5-A, one-way metal-covered unit is priced at 14s. 4d. per dozen. Steel unit switches with the underslung action are wider and have a longer break than the ordinary flush switch. A 5-A, one-way switch in polished brass costs 14s. 4d. per dozen, while a two-way shallow iron box, 5½ by 3 in., is listed at 21s. per dozen, and a plain brass plate suitable for this costs 28s. per dozen.

The switches produced by George Becker, Ltd., are of all "Bakelite" construction. Surface, semi-recessed and flush models are available in 5- to 10-A ratings, one- and two-way, and one-way surface switch costing 14s. per dozen and a two-way flush unit 17s. per dozen. Switch plates with up to four holes are available at up to 14s. per dozen.

Except for the "silent-toggle," all the switches produced by Messrs. J. A. Crabtree & Co., Ltd., are of the q.m. and b. type. There is the 3-A one-way unit which can be purchased in polished brass for 16s. per dozen, while at the other end are the 15- to 20-A, d.p., single-base flush shockproof switches, excluding the simpler heater switches, available at 73s. 8d. per dozen. Representative selections from the range are the "Underslung" and "Open" switches, which names indicate the nature of movements; the 5-A shockproof surface "Lincoln," which measures 2 in. by 1 9/16 in. and costs, in two-way style, 33s. 8d. per dozen; the one-way 15-A model costs 32s. a dozen; the surface ceiling switch, one-way polished brass, 36s. 8d. per dozen; a 5- to 8-A coupled d.p. switch, 42s. per dozen, polished brass; the 5-A semi-recessed "Binob"; d.p., single-base, semi-recessed 15/20-A unit—all brown shockproof 77s. 4d. per dozen; and the 5- to 8-A, loop-in terminal surface switch, which with a polished-brass cover costs 22s. 8d. in one-way style.

A very wide range of plates and boxes, &c., for flush switches includes surface and sunk teak and flush iron boxes, and metal, "Jacelite" and glass plates in all sizes up to 4-hole, 5½ by 5½ in., costing, in brown "Jacelite," 37s. 4d. per dozen (frames only).

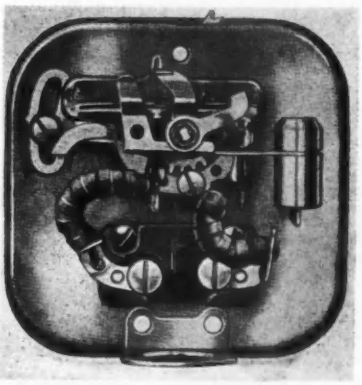
A 5-A, one-way, all-insulated tumbler switch made by the Ormond Engineering Co., Ltd., is sold at 144s. per gross.

The Patent Switch & Fuse Indicator Co., Ltd., manufactures a switch plate embodying a small neon light which glows when the main lamp is "off"; a single-hole plate costs 2s. 6d. The "Elsico" switch indicator (Electric Light Switch Indicators), for showing the position of a switch in the dark, costs 4s.

Plugs and Sockets

The comprehensive range of plugs and sockets available nowadays varies from the small units recently introduced for electric clocks to 20-A types. The Ferranti plug carries two ¼-A cartridge fuses and two spares, and is priced at 2s.

A Becker product is the "Bakelite" multi-plug, incorporating three 5-A sockets in the head of a 5-A plug (16s. per dozen), or one 15-A and two 5-A sockets in the head of a 15-A plug (28s. per dozen). A 5- to 10-A switch-plug,

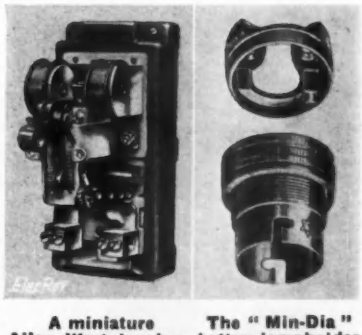


A mercury thermostat (Hart Mfg. Co.)

tumbler-type switch, sells at 32s. per dozen.

Among the productions of M.K. Electric, Ltd., there are sockets and switch-plugs with anti-flash shutters at the pin entrances. The sockets are available in 5- and 15-A ratings in surface and flush patterns, 2 and 3 pin, finished all brown or all white. In similar sizes, styles and finishes, switch-plugs can be obtained in s.p. and d.p. types. Spout outlets at the cable entrance and partially insulated pins are points of note in connection with the plugs. A range of interlocked switch-plugs includes 15-A units in which any make of 15-A, 3-pin plug will operate the interlock.

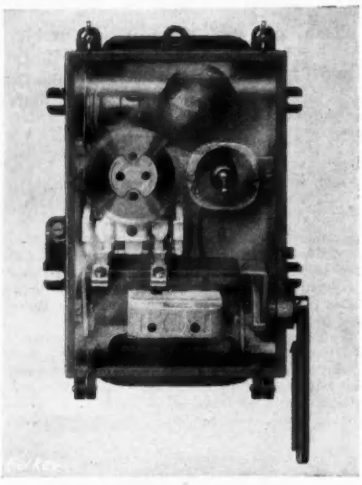
A competitive range of slot switch-plugs are all insulated and have fool-proof covers held by two screws. The



A miniature Allen West breaker **The "Min-Dia" batten lampholder**

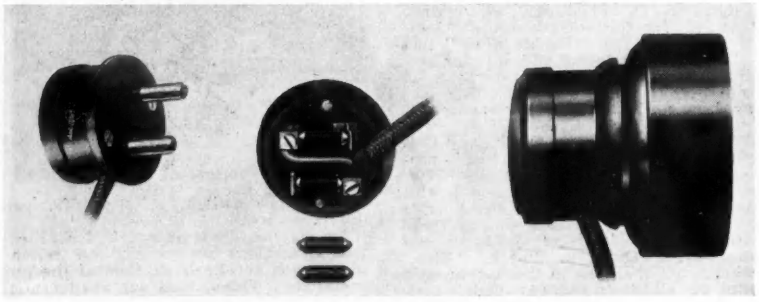
sockets are of the spring-grip pattern, and the action is q.m. and q.b. They are available all brown, &c., in 5, 5 to 8, and 15 A s.p., and 5 to 8 and 15 to 20-A d.p. models. The 3-outlet 2-pin plug is rated 5 A, and in conjunction with suitably fused plugs adequate protection is given. Rectangular plugs are available with 1-, 2-, and 5-A cartridge fuses, and a feature is a blown-fuse indicating device.

As with switches, there seems to be an unusually large number of special-purpose plugs in the "Lektrik" range, which covers units from such simple devices as a 2-pin plug with the "Minimax" adjustable-grip, side-entry, plug, costing 26s. 3d. for the 5-A model, and the "Turret" distributor, providing six



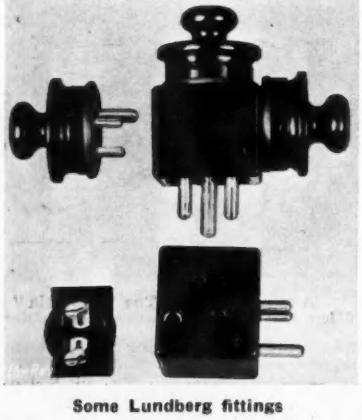
A Tucker cooker control

sub-circuits from a central round multiple socket. A 5-A "Kilarc" side-entry switch-plug (tumbler-type switch) costs 44s. per dozen, and the 2-A "Pivot" face-entry unit, with similar rating, is listed at 44s. per dozen. There is a compact d.p. side-entry tumbler-type switch-plug, and a 2-pin 5-A "Twinob,"



The Ferranti fuse-plug for clocks

with a porcelain top plug, priced at 53s. per dozen. The "Domino" extension connector at 30s. per dozen (5 A) is a convenient appliance for flexible cord, while the "Edgewise" switch is also available with a "Domino" type plug and also with automatic release. The "Auto combination" switch and plug with the release feature (tumbler switch side entry) with a porcelain top on cream, costs 105s. 3d. in the 10-A size. The "Limiter" permits the use of



Some Lundberg fittings

either the fixed lamp or the portable one, but not both together.

Included in the "Goltone" products are a 5-A 2-pin plug with central-hole entry, a 5-A 2-pin plug shield, H.O. pattern, with side-hole entry, and a 5-A moulded plug base, all at 7s. 6d. per dozen, in addition to a 5-A 2-pin large hand-shield plug at 13s. per dozen. A 5-A 3-pin surface plug and socket cost each 18s. per dozen. There is a 2-pin, 5-A extension adaptor at 1s. 6d. the set, as well as a 5-A "Bakelite" side-entry switch-plug, listed at 40s. per dozen.

In addition to the small fuse plug at 2s. each for clocks and radio produced by George H. Scholes and Co., Ltd., there is the larger "Wylex" 5-A fuse plug that will fit any standard 15-A 2-pin socket. The fuse is of the cartridge type, and spares are carried in the plug top. It costs 2s. 8d. There is also a dual plug which fits into a 15-A 2-pin socket and takes a 15-A radiator, and "Wylex" fuse plug, and another which fits into a 15-A switch-plug and fuse-plugs. The switch plug has a simple push-and-pull action in conjunction with a central pin, and a polarised model is non-reversible. A surface 5-A 3-pin plug costs 5s., a 10-A sunk pattern 7s. 6d., and 15-A flush pattern 7s. 8d.

The "H.B." switch-plug, produced by Henley Burrowes and Co., is completely interlocking and foolproof by virtue of the insulation part way up the pins, and the q.m.b. d.p. switch, which gives a double break on each pole to completely isolate both socket contact automatically when the plug is removed. The 10-A surface model costs 90s. per dozen, and the flush type 114s. per dozen.

Among the products of Santon, Ltd., are the multiple plug units, which are made in 5- and 15-A sizes, as well as 15- to 5-A reducing models. A complete 5-A surface plug and socket cost 25s., a flush-base 15-A unit costs 26s., and a 15- to 5-A reducing plug costs 18s. There is a switching plug with a rotary motion available in surface and flush types complete at 10s. and 11s.

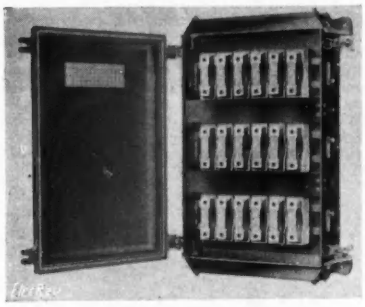
In 2-, 5-, and 15-A ratings there is an extensive range of "Telac" sockets and plugs in surface, sunk and flange patterns. A 2-A white china socket costs 11s. 8d. per dozen, a 5-A brown "Telacite" model with bushes is listed at 13s. 4d. per dozen, while a flange pattern for 15 A cost 25s. per dozen. Plugs are priced at from 7s. to 18s. 8d. per dozen for 2, 5, and 15 A, with side entry and flat top, according to finish. Three-pin sockets cost from 18s. for a 2-A surface model to 36s. for a 15-A flange pattern.

Tumbler-type switch-plugs, with side and front entries are available with the solid link and q.m. and b. movements, a 5-A front entry all-insulated model costing 38s. per dozen, and a 15-A model with a metal cover and side entry is listed at 75s. 4d. per dozen. The base diameter of the "Dual Point" switch-plug, with a heavy-duty q.m. and b.s.p. switch, and two 5-A, 2-pin socket points, is the same as that of the ordinary 5-A switch, and in all-insulated brown it costs 50s. 8d. per dozen, complete with two plugs.

"Sincord" ceiling switches are also available as combination units with one and two sockets and plugs. A 2-pin "Telacite" extension connector is made in 5- and 15-A sizes, and the "Fifteen-Five" adaptor in the same material provides one 15-A and one 5-A outlets from a 15-A plug.

"Stanlok" interlocked switchplugs are rectangular and made in surface, semi-recessed and flush types for 5 and 15 A with 2 and 3 pins. A 3-pin surface 5-A model in brown is listed at 83s. per dozen. A semi-recessed model rated at 15 A with two pins costs 198s. in white, and one for flush mounting, 5 A, 2-pin, in brown, costs 87s. per dozen. In similar ratings and styles there are "Nolok" switch-plugs with two or three pins.

Two-pin ordinary and 2- and 3-pin hand shield units are included in the Wandsworth range of plugs and sockets, 2-pin units complete in 3- 5- and 15-A sizes cost 20s. to 30s. 8d., 2-pin hand shield units in similar ratings are listed at from 24s. to 85s. 4d., while 3-pin hand shield plugs and sockets (5-15 A only) costs 37s. and 48s. 8d. There are also 3-pin all-"Bakelite" plugs and surface sockets with exposed earth terminals, 3-pin flush sockets and plugs, and 2- and 3-pin floor sockets and plugs with hinged covers. Of the last mentioned class a polished brass model with a "Bakelite" plug costs



A Crabtree fuse board

45s. 8d. per dozen. The new interlocked switch plug is produced in surface and flush types, with 10- and 15-A ratings, a 10-A surface model costing 64s. per dozen.

Among the range of Ormond "Bakelite" products there are simple 2-pin plugs listed at 5s. and 5s. 6d. per dozen, rectangular plugs listed 66s., and a hand-shield, 5-A 2-pin plug and a corresponding socket which cost 132s. per dozen complete.

Ranging from 8s. 4d. per dozen for a flat-top "Jacelite" 5- to 8-A 2-pin plug, and 15s. for a corresponding wall socket, to 32s. for a 3-pin 15- to 20A hand-shield "Jacelite" plug and 136s. per dozen for an ironclad brass-flanged corresponding socket, there are over forty Crabtree products apart from specialities. A 5- to 8-A 3-pin brown "Jacelite" plug with hand shield and side entry costs 23s. 4d. per dozen, and a 15- to 20-A 2-pin "Lincoln" socket in white costs 27s. per dozen.

Switch-plugs abound in rectangular, tumbler-switch, and bath-shaped types for all methods of mounting. The "Com-

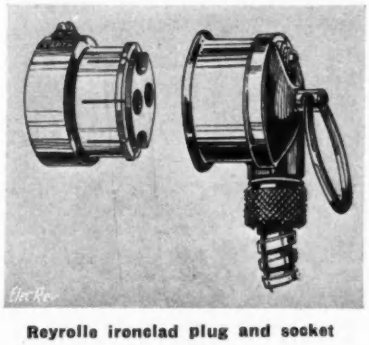
The "H.B." switch-plug

pact" 3-pin d.p. non-interlocking rectangular unit, 15- to 20-A, 2¾ in. by 4 in., complete with a plug, costs 12s. 4d., while a model similar in all respects, except that it is interlocking, costs 13s. 8d. A tumbler d.p. 5- to 8-A non-interlocking all-insulated white switch plug costs 52s. 4d. per dozen.

"Marbo" products provide a range which includes a small 2-pin 5-A real-walnut rectangular adapter at 12s. 6d. per dozen, to the 15-A, 3-pin q.m. and b. switch-plug with side entry and deeply recessed back, polished brass on cream, which is sold at 54s. 2d. per dozen. A 5-A wall plug and socket with a hand-shield plug costs 11s. 3d. per doz. The "Pozquik" and link actions already featured in "Marbo" switches are also manifest in the combination units. A 5-A polished brass on cream "Pozquik" switch plug costs 24s. 2d. per dozen, while a similar device with the link movement costs 21s. 8d. per dozen.

In ratings of 2, 5, 10, 15 and 30 A, nearly thirty 2- and 3-pin plugs of all shapes and types are shown in the "Magnet" catalogue. A 2-pin 2-A socket with a hard wood hand shield is priced 23s. per dozen. A 5-A shrouded plug and socket all brown "Bakelite" costs £1 9s. 8d. per dozen, and a 15-A fixing ring pattern plug and socket for flush mounting in a box, brown "Bakelite" with handshield plug, is priced £2 17s. 4d. per dozen. With switch-plugs the buyer has the choice between "Landor" and "Slick" movements already featured. A 2-pin 15-A face-entry "Bakelite" all-insulated tumbler type "Landor" is priced at 40s., all brown, while a 10-A "Slick" d.p. coupled switch mounted with polished brass covers costs £5 4s. per dozen with cream bases. Rectangular interlocked 3-pin units are available in surface, semi-recessed, and flush types, one of the last mentioned for 5-A loading and mounted in an undrilled conduit box with a flush plate and plug complete, costs in polished brass 9s. 4d. The new 2-pin 15-A and 3-pin 5-A "Magnet" flush wall sockets and plugs are available at 38s. and 44s. per dozen.

The General Accessories Co., Ltd., markets a range of switchplugs fitted with the "Speedfix" self-centring wiring terminal. The "Exalt" 5-A and 2-pin polished brass on flat and recessed back china costs 21s. 8d. per dozen (5 A) and 33s. 9d. (15 A). The "Exalt" "Bakelite" insulated covers and dollies are available at 22s. 11d. a dozen (5 A) and 36s. 8d. a dozen (15 A). 10-A models can still be obtained. The "Expresco" q. m. and b. switch-plugs are available with flat or recessed backs, the 5-A type costing 27s. a dozen, polished brass on white china, and the 15-A model 38s. 9d. a



Reyrolle ironclad plug and socket

dozen. The q. m. and b. 3-pin switch-plugs are available at 34s 7d. (5 A) and 55s. (15 A) a dozen, with polished-brass covers. "Bakelite" insulated types are 36s. 3d. and 60s. for 5- and 15-A models, respectively. Various kinds of 2-pin plugs are available from 7s. 11d. a dozen (5 A brown "Bakelite") to 13s. 9d. a dozen (15 A, white "Bakelite"). Three-pin brown "Bakelite" plugs, 5 A, 12s. 6d., and 15 A, 18s. 9d. a dozen. "Expresco" q.m.b. switch and plug combinations, 5 and 15 A, 2- or 3-pin, are marketed from

"Sandas" switch-fuse

51s. (2-pin, 5 A) to 105s. (3-pin, 15 A).

An ingenious arrangement of a multi-plug adaptor made by the Grafton Electric Co. enables any number of extra points to be added to a switch-socket. The new Reyrolle "Swug" plugs and sockets are made in the 2-pin type to take 5 A, 15 A or 30 A. Even using slow breaks, these plugs may be disconnected while "live" without injury, thus dispensing with a switch. With the "Andor" attachment complete removal is prevented unless the buttons attached to the side of the plug are pressed. A fuse-plug is also available. As these are protected and earthed, they are particularly useful in the kitchen or bathroom.

Lampholders, Ceiling Roses, &c.

"Bakelite" Marbo lampholders are produced in cord-grip and batten types at 4s. 7d. and 5s. per dozen, and 2- and 3-plate ceiling roses of English vitreous china are listed at 55s. and 70s. per gross.

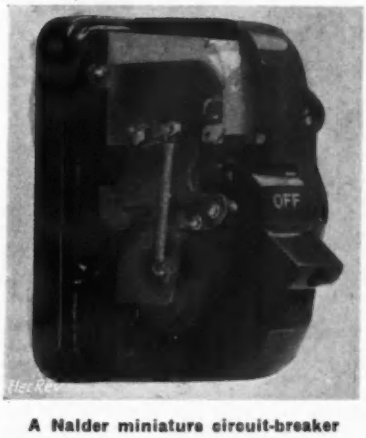
B.c. brass lampholders of shade-carrier pattern are listed by Crabtree's in cord-grip, screwed-nipple, and batten types (light and heavy) at 8s. 8d., 8s. 4d. and 11s. 4d., and 9s. per dozen for light patterns, respectively. B.c. brass switch lampholders cost from 30s. 4d. to 37s. 4d. per dozen, according to type, while "Bakelite" lampholders cost 10s. 8d. per dozen, standard brown, 33s. 4d. per dozen with switches, and 15s. 4d. per dozen for batten fixing. The equivalent styles are available in H.O. patterns. A H.O. brown lampholder for c.t.s. cable costs 18s. 8d. per dozen. Crabtree suspension switches are available with "snap" and simple push actions in brown and white "Bakelite," the former type costing 22s. per dozen. Bell pushes are available in surface, semi-recessed, and flush types, in addition to the usual barrel types, while ceiling roses of highly vitreous porcelain are listed at 9s. 8d. per dozen, two-plate.

Lampholder adaptors are produced by the Ormond Co. at 5s. and 6s. per dozen.

A lampholder adaptor socket is listed at 7s. per dozen, and a lampholder plug and socket set complete at 13s. per dozen. A "Bakelite" lampholder complete with a cord grip and skirt costs 32s. per gross. Wandsworth push-bar switch lampholders with and without skirts are available at 24s. and 21s. 4d. per dozen. Ceiling roses are produced in 2- and 3-plate types. A 5-A 2-plate 2-in. model costs 5s. 8d. per dozen, and circular cut-outs are listed at 8s. per dozen.

Metal lampholders with S-type interiors are sold by J. H. Tucker & Co. at 9s. and 11s. 4d. per dozen in standard, cord-grip and batten patterns, while "Kwikwire" solid-plunger b.c. metal and all-insulated lampholders cost 9s. and 13s. 8d. per dozen with cord grips and shade rings. A b.c. metal push-bar switch lampholder with a cord grip and shade ring costs 22s. 8d. per dozen, while the "Titan" all-insulated device with a cord grip and shade ring costs 7s. 4d. per dozen. An all-insulated push-bar switch lampholder with a q.m. & b. action costs 31s. 8d., with cord grip. A lampholder adaptor is available at 6s. per dozen, and another "Telacite" product is a suspension switch which in brown sells at 22s. per dozen. In the same material there is a ceiling rose priced at 6s. per dozen, while 2- and 3-plate roses in porcelain are available in 2-in. diameter, 2¼-in. diameter, standard B.S.S., and semi-recessed types, as well as models with "Kwikwire" terminals. A "Kwikwire" B.S.S. pattern, 2-plate, is listed at 7s. 8d. per dozen.

Ediswan products include iron connectors in standard switch and "Safeguard" types sold at 2s. 6d., 3s. 6d., and



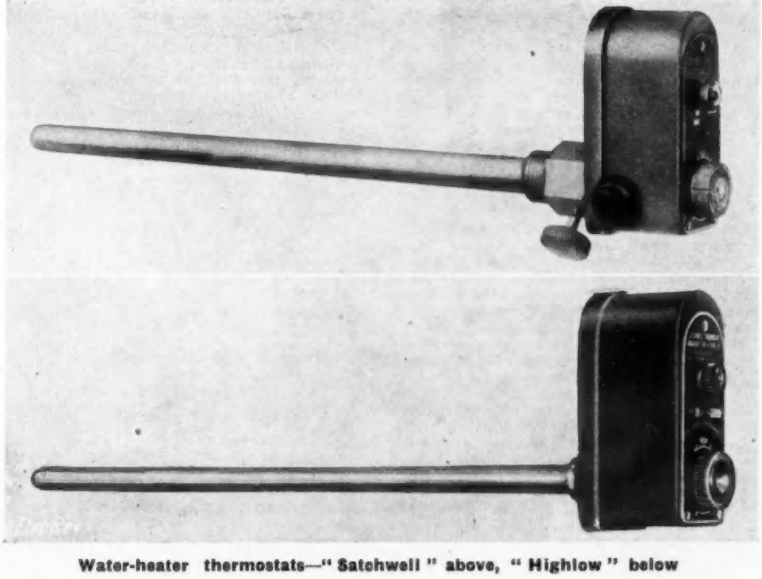
A Nalder miniature circuit-breaker

5s. 9d. each. A cord switch sells at 2s. 9d., and a "Bakelite" utility two-way lampholder adaptor is listed at 4s. The "Wylex" ceiling rose, which has four cable ways, a back entry, a third looping terminal, and the company's cord grip feature, is all "Bakelite," has 2-in. centres, and sells at 1s.

To continue the special-purpose "Lektrik" productions, there is a b.c. "Bakelite" battery-charging lampholder adaptor, which sells at 45s. per dozen, an adjustable-pin adaptor, the "Presto" pendant switch in single- and two-way types with a q.m. & b. movement, push-button switches in 3-, 5-, and 10-A capacities, 2-A push and pull switches, "Pixy" bell pushes, radio flush switches, the "V.C." switch for vacuum cleaners, etc., and a 2-A device of edge-wise construction, which sells at 33s. per dozen.

There are two 10-A "Becker" shock-proof connectors for irons, etc., including one with an earthing terminal and outside earthing contacts, which sells at 9s. per dozen. A "Bakelite" bell push is listed at 10s. 6d. per dozen. Six types of apparatus connectors produced by Premier Electric Heaters, Ltd., include a single-way unit for boiling appliances, a twin unit for original-type irons, a triple unit for universal-voltage apparatus, a twin connector for the "Super-Smoothwell" and "Smoothwell" appliances, and an earthing connector for irons and kettles, etc., which sells at 4s.

The wide range of appliances made by Victor H. Iddon, Ltd. ("Nettle"), includes "Bakelite" lampholders of all descriptions, ceiling roses, and suspension switches. A lampholder with a brass sleeve and a shade ring costs 5s. 4d. per dozen. A H.O. pattern lampholder with a long skirt costs 6s. 4d. per dozen. The interiors of a heavy range of "Nettle" lampholders are of steatite. A



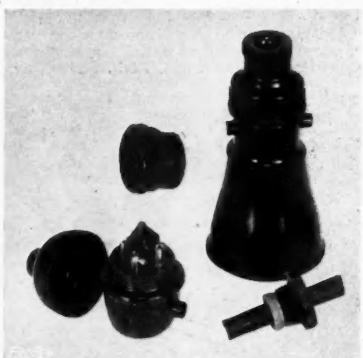
Water-heater thermostats—"Satchwell" above, "Highlow" below

"Bakelite" cap cord grip and short sleeve costs 6s. per dozen, and a H.O. pattern device is listed at 7s. per dozen. An all-insulated H.O. switch lampholder with a waterproof cord grip costs 19s. 8d. per dozen. Two- and three-plate ceiling roses have automatic cord grips.

"Magnet" lampholders include the "Economic" type with pressed domes, the standard type with cast domes (⅜-in. brass thread plain liner, 10s. per dozen). "Excel" complying with B.S.S. No. 52 (square cord grip and shade ring, 14s. per dozen), and small b.c. models and special-purpose types, such as that with a suspension loop and cord grip and a spiral anti-vibration spring and shade ring, which costs 30s. 8d. per dozen. A push-bar switch unit with ⅜-in. brass thread and shade ring is listed at 24s. 4d. per dozen.

The "Bakelite" range is also fairly extensive. A cord-grip type with a H.O. shield costs 9s. 4d. per dozen (brown), and a back-plate type with an elongated shade ring is priced at 16s. per dozen. A push-bar switch unit with a cord grip and shade ring costs 32s. per dozen. Suspension switches are available in a variety of forms, a hardwood white enamelled q.m. & b. 2-way model selling for 32s. per doz.

Selections from the "Goltone" products applicable to this section are the



"Nettle" pear switch and lampholder

recently introduced pear-switch conversion attachment, listed at 3s. 3d., round and rectangular bell pushes, "Bakelite" switch plates, a wide range of lampholders, including the shade-ring pattern with a cord grip, which costs 7s. 6d. per dozen, and a H.O.-type batten holde. listed at 13s. per dozen. A barrel switch for through connection is listed at 2s.

The new miniature lampholders made by "Beeantee" Illuminations, Ltd., are made in either d.c. or c.s. types for standard supply voltages and can be used for illuminating gardens.

A "Lowa" dimming switch

The spring socket used in switch-plugs and plugs produced by C. H. Parsons, Ltd., increases the area of contact with the pin, which it grips with an evenly distributed and radially directed resilient pressure by virtue of the spring ring. Special features of a new 5-A q.m. and b. 2-pin switch-plug are the hollow back to accommodate surplus cable, a detachable fibre plate to block the cable entry when not required, and the provision by the cable entry for surface wiring without the use of a block. A 5-A q.m. and b. 3-pin switch-plug has a "Bakelite" plug with

Marbourn switch-plug

a fibre plate, and the hollow-back feature. The D-shape 5-A "Bakelite" plug is simple but substantial. There is just one central fixing screw for the cover, and the pins are each in one piece and easily removable.

"Black Prince" switch-fuses fairly recently introduced by Simplex Conduits, Ltd., are of lighter construction than the makers' standard "S.E.S." gear, with its reciprocating pattern movement. The composite case is of pressed steel and grey iron, black stove enamelled throughout, and has two ¾-in knockouts at the top and four fixing holes inside. A 5-A plug and socket conduit fitting has a stone-hard white china plug and sprung sockets (2-pin with B.S.S. centres), and it is also supplied in brown china at a slight extra cost. It is available in ⅜-, ¾-, and 1-in. sizes. Flanged ceiling fittings of malleable iron are tapped for ⅜- or ¾-in. conduit, and two internal lugs have tapped fixing holes set at 2-in. centres. Standard conduit roses, ceiling roses, and ceiling plates may be attached directly as the flange covers the edges of the hole in the ceiling. Switch-splitter units, cooker switches, and distribution boards are also included in this company's comprehensive range of products.

Cooker Controls

A standardised cooker control unit produced by the M.E.M. Co. is the "Memkuka," which consists of a 30-A d.p. main switch fitted with a 5-A all-insulated switch controlling a fuse-protected plug. Complete with a pilot light, the whole is enclosed in a cast-iron case.

"M.K." equipments include an ironclad panel in which all the controls are enclosed within a case with inspection cover. The main switch is rated at 30 to 35 A and the s.p. 3-pin interlocked switch-plug at 5 or 15 A. Hardwood models are also available fitted with "Bakelite" accessories, including a 30- to 35-A main switch, a totally enclosed replacement fuse, and an alternative range of controls for the secondary circuit.

J. A. Crabtree & Co. have developed a comprehensive range of equipments, including teak-cased and ironclad units.

Examples of the very extensive range of equipments produced by J. H. Tucker & Co. are the "Sentry" controls, which, in addition to the 30-A main switch, include combinations of 2- and 3-pin 5- and 15-A sockets and switches. The "Petite" control unit fitted with a 20-A d.p. main switch and a 5-A switch and a 2-pin socket, costs 16s. 8d., finished grey enamel. There are two "Prento" control units, 30- and 40-A main switches, in each of the ironclad and teak-cased types. A 30-A ironclad unit finished in black enamel costs 21s. A 40-A model in wood costs 23s. 4d.

"Sandalux" cooker control switches are available for main circuit currents of 20, 30 and 60 A, with sub-circuit currents of 15 A, and are priced from 13s. 8d. to 36s. each. The Belling cooker control panel, fitted with a 35-A main switch, costs £1. Model "B" is fitted also with a 5- to 7-A 3-pin socket for a kettle, and costs £1 10s.

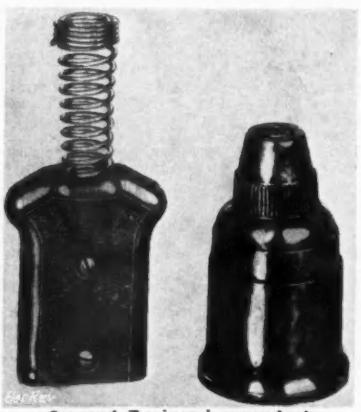
The 10-A, 250-V, "Tok Kubic" cooker switch produced by Tok Switches, Ltd., is a one-hole fixing, three-heat switch for mounting immediately behind the front plate of a cooker, and the switch itself is of the reciprocating pattern. The base is square and of a dark material, well finished throughout and about 2½ in. square, and the terminals are easily accessible.

Thermostats

Devices made by Electric Fires, Ltd., for the control of water heaters include an a.c. protected type "S.W.P." for 15 A, which sells at 58s.; type "S.W.R.," a similar although smaller device, priced at 50s. without a protecting cover; and type "H," for only 3 A (250 V), which is listed at 28s. For d.c. mercury-tube patterns are available at from 65s. to 92s. (6 to 20 A protected), and from 58s. to 85s. (6 to 20 A unprotected).

Archibald Low & Co., Ltd., sell contactor switches for air heating complete with an automatic control switch (40s.), in a metal box, for from £3 19s. 6d. to £14 2s. A water-heater thermostat costs 38s. unprotected (15 A, 50 cycles), and a mercury-type switch for water heaters, £2 4s. 6d. (6 A).

Berry's Electric, Ltd., sell a water heater thermostat unprotected for £2 8s. (10 A), and a mercury tube for incorporation at 15s. (10 A). The "Unity" thermostat sold by Barker, Young & Co., Ltd., will handle 20 A on a.c. or d.c. (100-250 V), has a standard temperature range of



Ormond Engineering products

45 to 75 deg. F., and is priced at £2. It measures 6 by 4½ by 2½ in.

Among the products of the Rheostatic Co., Ltd., there are the type N thermostat, which has been developed specially for the control of tubular and panel heaters, &c., 10-15 A up to 250 V a.c., 0-10 A up to 250 V a.c., and 0.1 A up to 250 V d.c.; type K serves the same purpose, but is more artistic and should be used with a relay or a contactor for controlling heating loads; a range of immersion thermostats primarily intended for self-contained water heaters and for conversion jobs in which heaters and thermostats are fitted to existing cisterns; a small thermostat for the smaller water heaters; and a range of a.c. relays suitable for domestic use.

The direct-break thermostat introduced by the Hart Manufacturing Co. is designed for the temperature control of liquids from 120 to 200 deg. F., principally in connection with water-heating tanks. A bronze casting screwed into the tank enables the thermostat to be removed without emptying the tank. Calibration and setting for any given temperature are easily accomplished by simply removing the cover and setting the indicator at the desired temperature. The cover and all parts are finished with a heavy cadmium plate. Wiring is facilitated by large terminal screws, and support is provided for BX or rigid conduit.

Other suppliers of thermostats include Birka Regulator Co., Ltd.; Drayton Regulator & Instrument Co., Ltd.; Ferranti, Ltd.; Isenthal & Co., Ltd.; Venner Time Switches; and Salford Elect. Instruments, Ltd.

"Lowa" dimming switches for the control of lamps in nurseries, sick rooms, &c., are supplied by Dimmers (1926), Ltd. in three types. Five lighting points and an "off" position are provided on type A, which is supplied with constant ratings of from 20 to 60 W at from 12s. 6d., according to finish. Type A.R. is similar except that it has a rotary action and it is priced from 15s. 6d. T.B. is of the same construction as T.A., but is available in larger ratings up to 150 W at from 15s.

Section XIV.—Index to Manufacturers

Giving the names and addresses of firms mentioned in the foregoing articles

A. E. G. Electric Co., Ltd., 131, Victoria St., S.W.1.
Aidas Electric, Ltd., 22, Newman Street, W.
Alton Battery Co., Ltd., Alton, Hants.
Aron Electricity Meter, Ltd., 80-2, Salisbury Road, Kilburn, N.W.6.
Arora Co., Rosebery Street, Loughborough.
Atlas Carbon Battery Co., Ltd., 56, Southwark Bridge Road, S.E.1.
Austinlite, Ltd., Lighthouse Works, Smethwick, Birmingham.
"Bakelite," Ltd., 68, Victoria Street, S.W.
Barker, Young and Co., 47, Victoria Street, S.W.
Bastian & Allen, Ltd., 26, Cross Street, Essex Road, N.
"Beantee" Illuminations, Ltd., 70, Banner Street, E.C.1.
Becker, G., Ltd., Stadium Works, Wembley.
Bell Fireplace, Co., 16, Berners Street, W.
Belling & Co., Southbury Road, Enfield.
Belling & Lee Ltd., Cambridge Arterial Road, Enfield.
Benham & Sons, Ltd., 66, Wigmore Street, W.
Benjamin Electric, Ltd., Tariff Road, Tottenham, N.17.
Benn, L., & Co., Ltd., 8, Colonial Avenue, Minories, E.C.
Berkeley & Young, Ltd., Tyseley, Birmingham.
Berry's Electric, Ltd., 85-86, Newman Street, W.
Best & Lloyd, Ltd., Cambray Works, Handsworth, Birmingham.
Birkbys, Ltd., Woodfield Mills, Liversedge.
Birka Regulator Co., Ltd., 17, Victoria Street, S.W.1.
Blackstone & Co., Ltd., Stamford, Lincs.
Bonnella, D. H., & Son, Ltd., 46-48, Osnaburgh Street, N.W.
Boulton & Paul, Ltd., Riverside Works, Norwich.
Bowker, S. O., Ltd., 20, Branston Street, Birmingham.
Brackett, F. W. & Co., Ltd., Hythe Bridge Ironworks, Colchester.
Bratt, Colbran & Co., 10, Mortimer Street, W.
Bray, Geo., & Co., Ltd., Leeds.
British Automatic Refrigerators, Ltd., Eccleston Court, S.W.
British Battery, Co., Ltd., Clarendon, Watford.
British Central Elecl., Co., Ltd., 6-8, Rosebery Avenue, E.C.
British Elec. Domestic Appliances, Ltd., 3, Hanover Court, E.C.
British Elec. Transformer Co., Ltd., Wellington House, Strand, W.C.2.
British Hanovia Quartz Lamp, Co., Ltd., 3, Victoria Street, S.W.
British Hard Rubber, Co., Ltd., Wharf Road, Ponders End, Mddx.
British Insulated Cables, Ltd., Prescot, Lancs.
British Thomson-Houston Co., Ltd., Rugby.
British Vacuum Cleaner & Engineering, Co., Ltd., Parsons Green, Lane, S.W.
Britannia Batteries, Ltd., Redditch.
Brodersen, A., 11, Northampton Square, E.C.
Brook, J. A., 24, John William Street, Huddersfield.
Brown Bros., Ltd., 20-34, Gt. Eastern Street, E.C.
Browning's Electric Co., Imperial Works, St. Martin's Avenue, East Ham, E.
Bulle Co., Ltd., 83, Hatton Garden, E.C.1.
Burne-Jones, Co., Ltd., 296, Borough High Street, S.E.1.
Burnley Components, Ltd., Rose Grove, Burnley.
Callender's Cable & Construction Co., Ltd., Hamilton House, Victoria Embankment, E.C.4.
Calvete, I., Ltd., 59-61, North Street, Clapham, S.W.
Candy & Co., Ltd., Heathfield Station, nr. Newton Abbot.
Carborundum Co., Ltd., Trafford Park, Manchester.
Carron Company, Carron, Scotland.
Century Electric Company, 5, Chancery Lane, W.C.
Chamberlain & Hookham, Ltd., New Bartholomew Street, Birmingham.
Chesterton, Jones & Co., 41, Berners Street, W.
Chloride Electrical Storage Co., Ltd., Clifton Junction, Manchester.
Concordia Electric Wire Co., Ltd., 81, Milton Street E.C.2.
Cooper Stewart Engineering, Co., Ltd., 136, Long Acre, W.C.
Cossor, A. C., Ltd., Highbury Grove, N.5.
Crabtree, J. A., & Co., Ltd., Lincoln Works, Walsall.
Credenda Conduits, Co., Ltd., Oldbury, Birmingham.
Cressall Mfg., Co., 31-32, Tower Street, Birmingham.
Crossley Bros., Ltd., Openshaw, Manchester.
Curfew Electric Heaters, Curfew Poultry Farm, Gogmore.
Dernier, L., & Hamlyn, Ltd., 23, Newman Street, W.
Dimmers (1926), Crown Works, Berryman's Lane, S.E.
Dixon, R. G., & Co., Ltd., 116, Victoria Street, S.W.
Domestic Electrification, Ltd., Townsend House, Greycoat Place, S.W.
Dowsing Radiant Heat, Co., Ltd., 91-93, Baker Street, W.
D.P. Battery Co., Ltd., Bakewell, Derbyshire.
Drake & Gorham Wholesale, Ltd., 77, Long Acre, W.C.
Drayton Regulator & Instrument Co., Ltd., West Drayton, Middlesex.
Eastick, J. J., & Sons, 118, Bunhill Row, E.C.1.
Ebonestos Insulators, Ltd., Rollin's Street, Canterbury Road, S.E.
Edison Swan Electric Co., Ltd., 124, Victoria Street, E.C.4.
Electric Art Shades (1928), Ltd., Feering Factory, Kelvedon.
Electric Domestic Appliance Co., Kingstanding Road, Perry Barr, Birmingham.
Electric Fires, Ltd., Heatrae Works, Norwich.
Electrical Equipment & Carbon Co., Ltd., 107-111, New Oxford Street, W.C.

Novel and effective lighting at the Aldwych Corner Restaurant, W.C.2, which is arranged on Spanish lines

Electric Light Indicators, 81, Milton Street, Sydney Avenue, E.C.2.
Electro-Dynamic Construction Co., Ltd., Devonshire Grove, S.E.15.
Electrolux, Ltd., 153-5, Regent Street, W.
Electroway Heaters, Ltd., Baxter Gate, Loughborough.
Elkay Electrical Mfg. Co., Ltd., 4, Southampton Row, W.C.
Elliott, E., 126-8, Brearley Street, Birmingham.
Enfield Cable Works, Ltd., Lincoln House, High Holborn, W.C.1.
English Electric Co., Ltd., Queen's House, Kingsway, W.C.
Ever Ready Co., (Gt Britain). Ltd., Hercules Place, Holloway, N.
Everett, Edgcumbe & Co., Ltd., Colindale Works, Hendon.
Falk, Stadelmann & Co., Ltd., 83-93, Farringdon Road, E.C.
Falkirk Iron Co., Ltd., Falkirk.
Ferranti, Ltd., Hollinwood, Lancs.
Formo Co., Southmill Road, Shirley, Southampton.
Forward Electric Co., Ltd., Perry Barr, Birmingham.
Foster Engineering Co., Ltd., Apex Works, South Wimbledon, S.W.19.
Francis Lamp Locks, Ltd., 2-4, Cockspur Street, S.W.
Francis Tool & Engineering Co., Ltd.

Installation Materials *(concluded from the opposite page)*

Several small electric soldering irons for light jobs and radio work are available. The "Midget" (Browning's Electric Co.) has a loading of 45 W and sells at 10s. The "Solon" is a product of W. T. Henley's Telegraph Works Co., Ltd., and is priced at 7s. 6d. (65 W). The Hotpoint soldering irons loaded at 55 and 95 W are listed at 15s. 6d. and 18s. 6d.; larger models at 150 and 200 W cost 28s. and 45s.

L. G. Hawkins' 150-W model costs 29s. 6d., while the "Xcel" H 90232, 100-W type costs £1. The "Gee-Gee" soldering irons include type S.1, 50 W, 10s. 6d.; S.2, 100 W. 18s. 6d.; and S.3, 250 W, 22s. 6d.

Lead headed wall nails which many wiremen have found handy for conduit fixing, &c., are supplied by T. F. Snow in 1-, 1½-, 1½-, 2-, 2½-, and 3-in. sizes.

The garage and service kit supplied by S. Wolf & Co., Ltd., consists of a stout metal case containing an electric drilling machine of ¼ in. capacity in mild steel complete with an automatic keyless chuck, and various bench tools and accessories; it costs £9 10s.

Skylux, Ltd., makes the "Skylux" shade-ring remover of the pincers type for insertion in narrow shades; price 4s. The following companies produce lamp locks: Francis Lamp Locks, Ltd. (keyless, 18s. per dozen); J. A. Brook; Edison Swan Electric Co., Ltd.; Veritys, Ltd.; Francis Tool & Engineering Co., Ltd.; Lamlok, Ltd.; G. S. Peckham & Co.

A product of McLeod & McLeod is the "Mandem" grip fast screw driver, which should find many uses in the home. A collar over the two sections of the blade renders the distance apart adjustable, so that the screw can be gripped in its slot. Two models are available at 1s. and 1s. 6d.

This company also supplies ceiling roses, wood blocks, plugs, switches, connectors, junction boxes, sockets and flexible wires, "Frigidens," water-proof air tight refrigerator door cushion gaskets in five sizes, 0 to 4, in reels of 500 to 1,500 ft., and also "Feet-o'-Felt"—felt feet for wireless cabinets, &c.

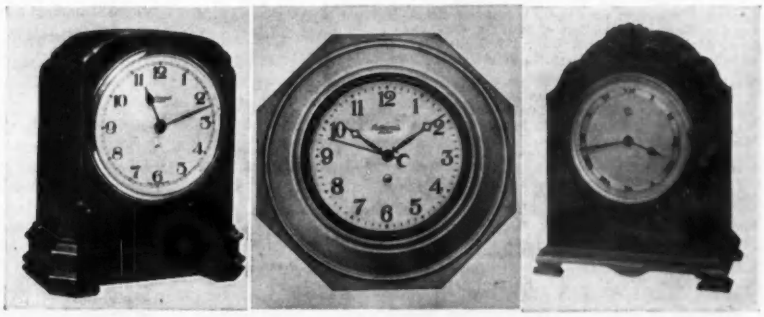
Heat insulation mattresses for application to existing cylinders are supplied by the Arora Co. in widths of 7 in. and 4 in., about 30 in. long, and 2 in. thick. They are intended to be supported round the tanks by tapes.

"Vitreosil" consists of pure silica fused by a special process by the Thermal Syndicate, Ltd., prepared in three varieties—opaque, translucent, and transparent. It is suitable, *inter alia*, in certain forms for both electrical and heat insulation, as well as for the "glass ware" of lighting fittings. A special production is a "sunshine" lamp.

"Permcoal" is a non-discolouring ebonite produced by the British Hard Rubber Co., Ltd., in black, mahogany and walnut. It has a mirror finish.

"Elo" synthetic resin mouldings are produced by Birkbys, Ltd., in various forms suitable for the construction of all types of domestic electrical apparatus, or accessories, &c., vacuum cleaners, switches, &c. Other companies who produce similar mouldings are "Bakelite," Ltd.; D. H. Bonnella & Son, Ltd.; Ebonestos Insulators, Ltd.; E. Elliott; Healey Mouldings, Ltd.; India-Rubber, Gutta Percha & Telegraph Works Co., Ltd.; Insulators, Ltd.; Lissen, Ltd.; St. Helens Cable & Rubber Co., Ltd.; and Wright, Bindley & Gell, Ltd.

20th Century Electrical have sent us some samples of very fine silk-covered flexible leads.



Three more electric clocks (see p. 553): The Rothermel "Glenmora" and kitchen models and a Landis & Gyr "Industa"

Fraser & Howard, Ltd., 22, Ely Place, E.C.
Frigidaire, Ltd., Edgware Road, The Hyde, Hendon.
Froy, W. N., & Sons, Ltd., Brunswick Works, Hammersmith, W.
Fuller Accumulator Co., Ltd., Woodland Works, Chadwell Heath, Essex.

"Gadgets," 141, Goldsmith's Row, E.2.
Gambrell Radio, Ltd., Merton Road, S.W.18.
Geipel, W., Ltd., 156-170, Bermondsey Street, S.E.
General Accessories Co., Ltd., 18, Euston Buildings, N.W.
General Electric Co., Ltd., "Magnet House," Kingsway, W.C.2.
General Radiological & Surgical Apparatus Co., Ltd., 204, Gt. Portland Street, W.1.
Gent & Co., Ltd., 47, Victoria Street, S.W.1.
Gillespie & Beales, 12, Norfolk Street, W.C.
Gillett & Johnstone, Ltd., 43, Whitehorse Road, Croydon.
Girlings, Ltd., Electricity Works, Maldon.
Glasgow Electrical Engineering Co., Ltd., 45-47, Pitt Street, Glasgow.
Glover, W. T., & Co., Ltd., Trafford Park, Manchester.
Gothic Electrical Supplies, Ltd., Severn Street, Birmingham.
Grafton Electric Co., 54, Grafton Street, W.1.
Green, George, & Co., Gee Gee Works, Chapel Road, West Norwood, S.E.

Hague & McKenzie, Ltd.
Hart Accumulator Co., Ltd., Marshgate Lane, Stratford, E.

New turbines have recently been installed at what is stated to be the world's largest power station, that of the Interborough Rapid Transit Co. of New York at East 74th Street. Behind the 40,000-h.p. turbine in the foreground is to be seen a 100,000-h.p. Westinghouse triple compound turbine, which can generate nearly half the energy required for traction purposes in Manhattan

Hart Bros. Elec. Mfg. Co., Ltd., 4, Queen's Wall, Ponders End.
Hattersley Bros., Ltd., Queen's Foundry, Swinton, near Rotherham.
Hawkins, L. G., Co., Ltd., 30-35, Drury Lane, Kingsway, W.C.
Healey Mouldings, Ltd., 239-241, Great King Street, Birmingham.
Henderson, D. M., & Co., Ltd., 45, Hatton Garden, E.C.
Henley Burrowes & Co., Hudson's Drive, Cotteridge, Birmingham.
Henley's (W. T.) Telegraph Works Co., Ltd., Holborn Viaduct, E.C.
Higgs Motors, Witton, Birmingham.
Hoffmann Manufacturing Co, Ltd., Chelmsford.
Hogan & Wardrop, Ltd., 25, Old Street, E.C.
Holophane, Ltd., Elverton Street, Vincent Square, S.W.
Hornby Electrical Supplies Co., Ltd., 77, Dean Street, W.1.
Horstmann Gear Co., Ltd, Newbridge Works, Bath.
Hotpoint Electric Appliance Co., Ltd., 24, Newman Street, W.
Hurley Machine Co., (England), Ltd., 55-59, Oxford Street, W.

Iddon, V. H., Ltd., 27, Blackfriars Street, Manchester.
Igranic Electric Co., Ltd., 147, Queen Victoria Street, E.C.4.
India-Rubber, Gutta Percha & Telegraph Works Co., Ltd., Silvertown, E.
Insulators, Ltd., Derby Road Works, Montague Road, Edmonton, N.
International Refrigerator Co., Ltd., 169, Regent Street, W.1.
Isenthal & Co., Ltd., Ducon Works, Victoria Road, North Acton, W.

Jackson Electric Stove Co., Ltd., 143, Sloane Street, S.W.
Johnson & Phillips, Ltd., Charlton, S.E.7.
Joyner, Charles, & Co., 223-5, Newtown Row, Birmingham.
Junit Mfg. Co., Ltd., 24-7, High Holborn, W.C.

Kelvinator, Ltd., 258, Gray's Inn Road, W.C.
K.F.M. Engineering Co., Ltd., 29, Portugal Street, W.C.2.
Klaxon, Ltd., 36, Blandford Street, Baker Street, W.1.
Kohler Co., Ltd., 216, Great Portland Street, W.

Lamlok, Ltd., 163, Vivian Avenue, Wembley, Mddx.
Lancashire Dynamo & Crypto, Ltd., Trafford Park, Manchester.
Landis & Gyr, Ltd., Elgee Works, Victoria Road, North Acton, W.
Laycock Engineering Co., Ltd., Victoria Works, Millhouses, Sheffield.
Le Carbone, Ltd., Coventry House, South Place, E.C.
Leda Electric, Ltd., Nelson Street, Miles Platting, Manchester.
Lissen, Ltd., Lissenium Works, Worple Road, Isleworth, Mddx.
Liverpool Elec. Cable Co., Ltd., Linacre Lane, Bootle.
London Aluminium Co., Ltd., Westwood Road, Witton, Birmingham.
London Electric Wire Co., & Smith's, Playhouse Yard, E.C.1.
Low, Archibald, & Sons, Ltd., 112, Hope Street, Glasgow.
Lundberg, A. P., & Sons, Ltd., 477-489, Liverpool Road, N.7.

Macintosh Cable Co., Ltd., Sinfin Lane, Derby.
McMichael, L., Ltd., Wrexham Road, Slough.
Mag Engine Co., Ltd., 839, Harrow Road, N.W.
Mann Egerton & Co., Ltd., 5, Prince of Wales Road, Norwich.
Manor Elec. Oven & Fire Co., 7, Sutton Street, Charing Cross Road, W.
Marbourn, Ltd., 120, Pratt Street, N.W.1.
Marco Refrigerators (1929), Ltd., Manor Works, Streatham Vale, S.W.
Mayall & Co., Ltd., 61, Moor Street, Birmingham.
McLeod & McLeod, 329, High Holborn, W.C.
Measurement. Ltd., Townsend House, Greycoat Place, Westminster, S.W.
Mek-Elek. Engineering, Ltd., 57, Victoria Street, S.W.
Medical Supply Association, Ltd., 167-185, Gray's Inn Road, W.C.
Metlex Industries, Ltd., 55, Sumner Road, Croydon.
Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester.
Midland Elec. Mfg. Co., Ltd., Barford Street, Birmingham.
Minimax, Ltd., Feltham, Mddx.
"M.K." Electric, Ltd., Wakefield Street, N.18.
Modern Domestic Equipment,
Monolamp Electric Fittings, 308, Regent Street, W.

Morris, Arthur, & Co., Ltd.
Moseley, H. G., & Co., Ltd., Hospital Street, Birmingham.
Mullard Wireless Service Co., Ltd., Charing Cross Road, W.C.2.

Nalder Bros. & Thompson, Ltd., 97a, Dalston Lane, E.8.
Nathan & Allen, Ltd., 131, Victoria Street, S.W.1.
Nobbs, George, Ltd., 87, Cleveland Street, Euston Road, W.1.
Northern Steel & Hardware Co., Ltd., 1, Southgate, Deansgate, Manchester.

Oldham & Son, Ltd., 40, Wicklow Street, King's Cross, W.C.1.
Orme, Evans, & Co., Ltd., Wolverhampton.
Ormond Engineering Co., Ltd., Ormond House, Rosebery Avenue, E.C.1.

Parsons Oil Engine Co., Ltd., Town Quay Works, Southampton.
Parsons, C. H., Ltd., Britannia Works, Wharfedale Road, Tyseley, Birmingham.
Partridge, Wilson, Evington Valley Road, Leicester.
Patent Switch & Fuse Indicator Co., Ltd., Ryan Street, Bradford.
Peckham, G. S., & Co., 18, Dulwich Wood Park, S.E.19.
Pertrix, Ltd., 233, Shaftesbury Avenue, W.C.2.
"Peter Pan" Utilities Co., Ltd., 24, Holborn, E.C.1.
Peto-Scott Co., Ltd., 77, City Road, E.C.1.
Petters, Ltd., Westland Works, Yeovil.
Philips Industrial, 145, Charing Cross Road, W.C.2.
Power Plant Co., Ltd., West Drayton, Mddx.
Premier Accumulator Co., 50, Grosvenor Gardens, Victoria, S.W.1.
Premier Electric Heaters, Ltd., Keeley Street, Birmingham.
Prentice, Ltd., Law Hall Mills, Holbeck Lane, Leeds.
Pritchett & Gold & E.P.S. Co., 50, Grosvenor Gardens, Victoria, S.W.1.
Pulsometer Engineering Co., Ltd., Nine Elms Iron Works, Reading.
Pye Radio, Ltd., Paris House, Oxford Circus, W.1.

Quaker, Silas, Ltd., 110, Park Street, N.W.1.

Reason Mfg. Co., Ltd., Lewes Road, Brighton.
Revo Electric Co., Ltd., Britannia Works, Tividale, Tipton, Staffs.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Rheostatic Co., Ltd., Slough.
R.I., Ltd., Purley Way, Croydon.
Rothermel Cpn., Ltd., 24, Maddox Street, Regent Street, W.1.
Rowlands Elec'l. Accessories, Ltd., 156, Hockley Hill, Birmingham.
Ruston & Hornsby, Ltd., Sheaf Ironworks, Lincoln.

St. Helens Cable & Rubber Co., Ltd., Slough.
Salford Electrical Instruments, Silk Street, Salford.
Sanders, W., & Co., Falcon Elec. Works, Wednesbury.
"Santas" Electrical Co., 50, Mortimer Street, W.1.
Santon, Ltd., 150, Dock Street, Newport, Mon.
Scholes, G. H., & Co., Ltd., Blantyre Street, Chester Road, Manchester.
Selz, C., 47, New Cavendish Street, W.1.
Shaw (John), & Sons, Ltd., Wolverhampton.
Siddons, J. J., & Co., Ltd., West Bromwich.
Siemens Bros., & Co., Ltd., Woolwich, S.E.18.
Siemens Elec. Lamps & Supplies, Ltd., 139, Upper Thames Street, E.C.4.
Siemens-Schuckert (Gt. Britain), Ltd., 30, New Bridge Street, E.C.4.
Simplex Conduits, Ltd., Garrison Lane, Birmingham.
Six-Sixty Radio Co., Ltd., 17, Rathbone Place, Oxford Street, W.1.
Skefko Ball Bearing Co., Ltd., 100, Kingsway, W.C.2.
Skylux, Ltd., 22, Great St. Andrew Street, W.C.2.
Smith's English Clocks, Ltd., 185, Great Portland Street, W.1.
Snow, T. F., 247, Shakespeare Road, S.E.24.
Soapstone Products Co., 6, Holborn Viaduct, E.C.1.
Société Industrielle d'Horlogerie et d'Appareils Electrique, Paris.
Speirs & Co., H. M., 272, St. Vincent Street, Glasgow.
Standard Battery Co. (Wates), 184, Shaftesbury Avenue, W.C.2.
Standard Telephones & Cables. Ltd., 364, Gray's Inn Road, W.C.2.
Stanley Electrical Co., 60, Porchester Road, W.2.
Stonebridge Electrical Co., Ltd., Victoria Road, W.3.
Strich, Carl, 50, Mortimer Street, W.1.
Sturge & Baker, Ltd., Premier Works, Sheepcote Street, Birmingham.
Sullivan, H. W., Ltd., Leo Street, Peckham, S.E.15.
Sun Electrical Co., Ltd., 118, Charing Cross Road, W.C.2.
Synchronome Co., Ltd., 32, Clerkenwell Road, E.C.1.

Telegraph Condenser Co., Wales Farm Road, W.3.
Telephone Mfg. Co. (1929), Ltd., Hollingsworth Works, Martell Road, S.E.21.
Terry, Herbert, & Sons, Ltd., 27, Holborn Viaduct.
Thermal Syndicate, Ltd., Thermal House, Old Pye Street, S.W.1.
Tok Switches, Ltd., 103, Kingsway, W.C.2.
Tucker, J. H., & Co., Ltd., King's Road, Tyseley, Birmingham.
Tudor Accumulator Co., Ltd., 50, Grosvenor Gardens, S.W.1.
Turner Art Metal, Ltd., 61, Summer Hill Street, Birmingham.
Twentieth Century Electrical, 30, Gerrard Street, W.1.

Union Cable Co., Ltd., Dagenham Dock, Essex.
Univolt Electric, Ltd., 119, Finsbury Pavement, E.C.2.

Venner Time Switches, Ltd., Kingston Bye-Pass Road, New Malden.
Veritys, Ltd., 31, King Street, Covent Garden, W.C.
Vessco, Ltd., 1, Red Lion Square, W.C.1.

Walker, Hunter & Co., Ltd., Portdownie, Falkirk.
Ward & Goldstone, Ltd., Frederick Road, Pendleton, Manchester.
Wandsworth Electrical Mfg. Co., Ltd., Imperial Works, Birmingham.
Wardle Engineering Co., Ltd., Elsinore Road, Old Trafford, Manchester.
Watmel Wireless Co., Ltd., High Street, Edgware.
West, Allen, & Co., Ltd., Lewes Road, Brighton.
Westinghouse Brake & Saxby Signal Co., Ltd., 82, York Road, N.1.
White Electrical Instrument Co., Ltd., Rosoman Street, Rosebery Avenue, E.C.1.
Whitmee Engineering Co., Ltd., Grove Road, S.W.12.
Whittaker Bros., Ltd., Wolverhampton Street, Dudley.
Wholesale Fittings Co., 23, Commercial Street, E.1.
Wilkins and Mitchell, Darlaston, Staffs.
Wilkins and Wright, Ltd., Holyhead Road, Handsworth, Birmingham.
Wolf & Co., S., 115, Southwark Street, S.E.1.
Wood, R. A., Northern Road, Wembley Park, Middlesex.
Wright, Alan, Ltd., 117, Victoria Street, S.W.1.
Wright, Bindley & Gell, Ltd., Percy Road, Greet, Birmingham.

Z Electric Lamps & Supplies Co., Ltd., 21, Newman Street, W.1.

The Liverpool Electro-harmonic Society

Liverpool and District Electro-Harmonic Society has completed its arrangements for the ninth season, which opens on October 28th with a dinner and smoking concert at the Carlton Restaurant, Liverpool. A programme of smoking concerts and theatre nights has been prepared for the winter. On March 24th next members of the Manchester Society will probably be guests. On each occasion there will be a reception and dinner at the Carlton Restaurant. The hon. secretary of the Society is Mr. W. A. Sloane (Liverpool Cables), 24, Preesons Row, Liverpool, and the president is Mr. G. P. Dennis, M.I.E.E. (G. P. Dennis, Ltd.).

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

"Make the Connection"

With reference to the leaderette in your issue of October 7th, "Make the Connection," the following extract from the Industrial Survey of the Lancashire Area (excluding Merseyside) made for the Board of Trade by the University of Manchester (Stationery Office, price 6s.), should be of interest to many of your readers. On pages 249 to 250 the report says:—

"It is known that there is a considerable amount of private generating plant installed in industrial establishments in this region. . . . The position of private generation of electricity, it is clear, deserves to be exhaustively examined. In Great Britain, as a whole, the total capacity of private generating plant is almost one-third of the total plant in the country. The Censuses of Production of 1907, 1912 and 1924 showed that the growth in capacity of private plant was practically as rapid as the growth in capacity of public plant in the period 1907-24. Even since 1924 there has been no marked tendency for the installation of private plant to slow down.

"In the United States, on the contrary, there has been no appreciable extension of private plant in industry since 1920, whereas a remarkable development of the public supply has greatly increased the degree of electrification in industry. The discrepancy between English and American experience is difficult to understand in view of the fact that the average price per kWh of electricity sold to industrial power users is lower in this country than in the United States and the leading Continental countries, including Germany and France. . . .

"There can be no doubt that there is a large amount of private plant which is uneconomic and could advantageously be supplanted by supplies from public stations. The whole question of the existence of private plant independent of the national power scheme is of fundamental importance and, in a depressed area like industrial Lancashire in particular, should be investigated intensively with a view to making the best use of our regional power resources."

No doubt many of your readers are watching the figures in the Preliminary Reports of the fourth Census of Production (1930), now being published by the Board of Trade. About 100 industries have already been dealt with in Reports Nos. 1 to 20 inclusive, and these show that the capacity of prime-movers owned by private firms has increased from 6,172,350 h.p. to 6,449,299 h.p. between 1924 and 1930 in these industries.

October 7th. NATIONAL ECONOMY.

An Electrical Engineers' Club

We have read with interest Mr. F. J. Collis's letter on the above subject, which appeared in your issue of September 9th, and we trust you will be pleased to note that we have already anticipated the need for an Engineers' Club, of high prestige, and in the heart of the engineering headquarters. We think that the position of the Club is unique, and it offers its members every convenience. Only the very best of food and drink is served by an expert and highly drilled staff.

We are preparing a limited number of bed-sitting rooms fitted with telephones, electric light, &c., which residential part will be in charge of a capable and experienced steward. The qualification for membership is that every member must either be a principal of a firm of repute, or one holding a responsible position, and/or, that he must be a gentleman in every sense of the word.

The subscription fee for the first 300 members has been fixed at £3 3s. for Town members, and £1 11s. 6d. for country members. We do not propose to admit any ladies, but this decision may have to be altered at a later date, to suit members' wishes.

We shall be delighted to show any of your readers who may be interested over the Club, as we feel confident that the service and comfort can only meet with their approval.

UNITED ENGINEERS' CLUB, LTD.
46, Grosvenor Gardens, S.W.1, H. C. Vince,
October 6th. *Secretary.*

The Effects of Electric Shock

All the severe shocks I have received were some years ago, and my recollection of them is therefore not very vivid, as they date back to 1904. Speaking generally, d.c. shocks have always caused me a contraction across the chest and intense irritation. One afternoon, about 1908, I broke the shunt of a d.c. 400-V motor, receiving the shock through both hands. I saw a blinding flash, felt excruciating pain and as if I must burst, let out an agonising yell as I fell clear, cursed most volubly the foreman who came to my assistance, felt a contraction across the chest, and was very shaky for some two or three hours. I was not burnt, and felt no effects next day.

Another day my assistant wired the blades of a 330-V 40-cycle 3-phase knife switch to the buses instead of the contacts. On going to put in the switch I noticed that the two outside quick break contacts were out of line with the blades, so essayed to straighten them. I managed to get my fingers away but the juice somehow gripped my knuckles, which were well lacerated by the corners of the switch blades before I could fall clear, backwards, with my head on the corner of a wooden bench. I was badly shaken, a brilliant light flickered before my eyes, and I could not prevent my knuckles being hammered against the switch. I was fully conscious, and my reasoning was unimpaired as it prompted me to throw all my weight backwards instead of yielding to the current which seemed to be forcing me to my knees and tearing all my muscles. The pain was intense, and I could make no sound until I fell clear with a piercing yell. Except for bare knuckles I felt no effects after a few hours.

About 1910 I got 6,600 V a.c. from the terminals of a transformer. I saw a flash and was thrown clear with the sensation of being struck over the head. Result, 1¼-in. to 2-in. yellow water blisters upon the end of all my fingers, which formed immediately. I was shaky for some time after.

In 1920 I got 2,200 V at 50 cycles from some kWh meter terminals at the back of a switch-board. I was standing to the side and gripping a spanner and the metal frame of the board. Once more I seemed to be struck on the head and was thrown clear; otherwise unburnt, but shaky. Again, I was checking some metal tabs on the stator wiring of a stationary 3,300-V, 50-cycle winding motor, one-phase of which I afterwards found was permanently connected, the reversing being done on two phases only. I received what appeared to be another blow on the head and was thrown clear; my fingers were badly blistered, and I was shaky for an hour or two.

Upon the occasion of my last shock, I was disconnecting a 440-V, 50-cycle, two-phase, 3-wire cable in the basement of a power station which I had previously made dead. The first nut was very tight and I gripped the lead sheathing of the cable to get a purchase. There was an "earth" on the (2,000-V 3-phase) station of which I was not aware. Again I was shaken like a rat, saw blinding flashes, and managed to fall backwards. I felt shaky and constricted across the chest for the rest of the day, but was not burnt and did not have to lay off.

I cannot recollect whether I ever saw anything during the period the shock lasted, but am of opinion that the flickering light—presumably due to the frequency of the supply—would prevent one seeing anything.

Jodphur, India, *Sept. 21st.* C. H. WILSON.

Strange Restrictions at Ellesmere Port

At the present time we hold 130 applications from tenants of Council houses who wish to have their houses wired at their own expense under our assisted wiring scheme. We are willing to accept these applications and could obtain many more but for the fact that the Council has refused to allow the work to proceed. In these circumstances we feel it our duty to make the position known to the applicants and the public generally.

The Ellesmere Port Council held an Electricity Order from 1913 to 1922 without establishing a supply. In 1922, on representations made by the Mersey Power Company, the Council's Order was revoked and a new Order was granted to the Mersey Power Company in connection with which the latter paid to the Council a considerable sum of money and at once commenced a supply of electricity in the town. Since that date the Mersey Power Co. has laid out in all £222,269 in developing the area.

The authorised charges for electricity in the company's Order are the same as those that were in the Council's Order, namely, 8d. per kWh, but the company has never charged more than 6d. for lighting and 2d. for power and heating. There is an alternative rate by contract whereby a service charge is made depending on the size of the house or, in the case of shops, on the number of lights, and electricity then costs, in addition to the service charge, only 1d. per kWh for all purposes, or if an electric cooker is in use in the house ¾d. per kWh for all purposes.

The company provides appliances and equipment on hire and hire purchase, including the wiring of small property, the terms in the case of wiring being one-tenth of the cost payable when the work is done and the remainder payable by an addition to the charges for electricity by slot meter. The wiring may be done by the company's staff or by one of the local electrical contractors at the purchaser's option.

From the commencement the Council has refused to install electric light in its houses and tenants have had to use gas. Now, however, many tenants wish to take advantage of the

facilities offered to change to electricity, but although the Council will permit a tenant to wire his house if he pays the whole cost at the time, yet it will not permit him to wire it under the company's deferred payment scheme, notwithstanding that the Council incurs no financial obligation whatever in either case. The result is that only six Council houses in the town are wired for electricity.

Upon the above facts we think we are justified in asserting that the Council's veto is unfair and illogical as between one tenant and another; that it constitutes an interference with individual liberty; and that it also imposes a restriction on the legitimate business of this company (the largest ratepayer in the town), a company, moreover, which is affording a public service which the Ellesmere Port Council itself had neglected to provide.

The Mersey Power Co., Ltd.
Liverpool, *October 11th.* E. W. Wickes, *Secretary.*

Beauty and Utility

It is clear from the correspondence which this subject has inspired most people are agreed that overhead poles and wires in our villages—however carefully installed—are unsightly. The only excuse for their existence at all is that they are a necessary evil. Mr. Hoult would even say that because some petrol companies and garages have offended in the past, electricians can now follow suit and impose their monstrosities on the public regardless of the consequences. Imitation is not justification in this case.

In the great majority of cases, I do not agree that these poles and overhead lines are a necessity at all. Where compact villages are concerned, and in many other instances, the obvious method of proper distribution is underground with the gas, water, and drainage. I consider that sufficient care and forethought has seemingly not been applied to give a service of electricity and at the same time preserve as far as possible the character of the villages. This complaint is backed up by all the local architects with whom I have come into contact, by other discerning people, and many capable judges resident in the country.

I feel that there will be a reaction on the part of the public against the indiscriminate use of this untidy method of electricity distribution in the villages. That it is not impossible to employ a better means is shown by the fact that a very large area in Kent and Sussex is supplied entirely underground. I refer to the area supplied by the Weald Electricity Supply Co., Ltd. All services in every village are underground and the public has secured all the advantages of electricity without having had to make such a heavy and unpardonable sacrifice.

Crowborough, Sussex, *October 10th.* John McConaghy.

Waste Insulating Material

Mr. A. W. Rowell's criticism of the article on page 314 of your September 2nd issue by Mr. A. A. C. Dickson is fully endorsed by anyone who knows anything at all about the trade.

Referring to the imports of mica powder, Mr. Dickson should know very well that the bulk of this material is ground from virgin mica imported from the mines and is specially ground for the wall-paper trades and the like. As a filler for mouldings it is nonsense to talk of reducing prices in using it, for obvious reasons, quite apart from its unsuitability for most work. What he says about using waste micanite is also nonsense.

It is a little bewildering to understand why such an article should have been published in a leading electrical paper, as it is misleading to say the least of it.

I have actually had Continental manufacturing experience, and have been manufacturing both mica and micanite insulation for over twenty years, also "Bakelite" mouldings, and should know.

P. Freeman, Managing Director,
Mica Manufacturing Co., Ltd.
Bromley, Kent, *October 6th.*

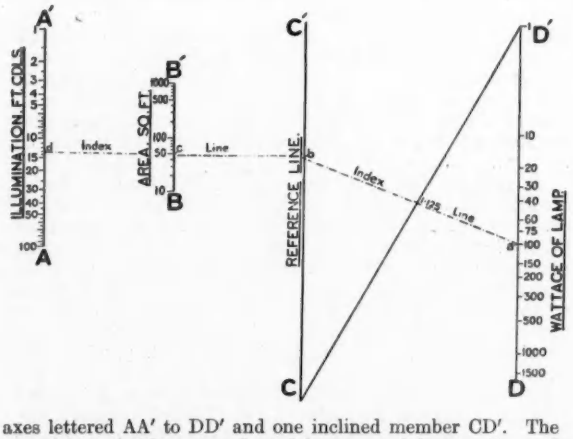
Intensity of Illumination. By A. Alison, M.I.Mech.E.

It is possible to make a reasonably accurate forecast of the intensity of illumination from a knowledge of the area to be lighted and the size of the lamp, although the results based upon this minimum cannot be stated with the precision possible when more information is to hand, such as the shape of the apartment, the colouring of surroundings, the spacing and mounting height of the fittings, etc.

The product of the foot candles of illumination and the area per point can be equated to some power of the wattage multiplied by a coefficient. Assuming that the utilisation factor is about one half and the lamp has a common type of dispersive reflector, the following empirical equation can be used, within limitations:

$$\text{Ft.-candles} \times \text{area in sq. ft.} = 3.75 \text{ (watts)}^{1.125}.$$

Such an equation can be conveniently solved graphically. The nomograph illustrated consists of four vertical parallel



axes lettered AA′ to DD′ and one inclined member CD′. The axes AA′ and BB′ are graduated in terms of foot-candles and sq. ft. per point, respectively. CC′ is a reference line and need not carry a scale. The wattage of the lamps appears on DD′. A single point denoting the power 1.125 is marked on the diagonal and all index lines drawn between the axes DD′ and CC′ must pass through this point.

The chart can be used to determine one of the three variables, foot-candles, area, or wattage, upon the assumption that two of the three have known values or have values assigned to them. By way of example, take any lamp size on DD′ and draw an index line through the point 1.125 on the diagonal and produce to intersect CC′. From the point of intersection draw a second index line through any predetermined area indicated on BB′ and produce to AA′ reading thereon the foot-candles. If the foot-candles had been previously chosen, the index line would denote on BB′ the area that would be illuminated to this intensity by the lamp in question.

To construct the line chart the axes AA′ and CC′ are drawn (say 6 in. apart) and BB′ is placed midway. From C the diagonal CD′ is drawn at any inclination and preferably of some even length, such as 10 in. The figure is completed by adding the remaining axis DD′. From D′ the axis is graduated in terms of wattage using a scale of, say, one inch=0.4 of a unit of logarithms. CC′, if graduated, would bear the same scale. Since BB′ is situated midway between AA′ and CC′ the scales on the axes AA′ and BB′ automatically become one inch=0.4 and one inch=0.8 of a unit of logarithms, respectively.

The single graduation on the diagonal must be inserted so that the distance from C to the graduation is 1.125 times the distance from D′ to the graduation, and if CD′ is 10 in., the point 1.125 occurs 4.71 inches from D′.

The final chart can be reduced to a three-line figure by drawing an index line from each lamp size on DD′ through the point 1.125, producing it to meet CC′, and marking each intersection with the wattage of lamp from which the index line originates. The true reading on CC′ are those of $3.75\ W^{1.125}$, namely, the terms on the right-hand side of the equation.

The graduations on AA′ can be inserted from any arbitrary datum but, if this is done, those of BB′ cannot. The vertical relationship of the two scales must be established by working out an example. The following set of values will serve and at the same time illustrate the use of the chart, where the wattage is 143, the area 100 sq. ft., and the foot-candles 10. The wattage does not correspond with the graduation of a standard size of lamp, but the position of the point on DD′ from D′ can be calculated, by taking the logarithm and dividing by 0.4. It will be found to be 5.39 in. from D′.

To locate the datum for the scale on BB′ the procedure is as follows:—From 143 watts (*a*) on DD′ draw an index through point 1.125 and produce to meet CC′ at (*b*). From (*b*) draw a second index to meet AA′ at the graduation 10 ft.-cdls. The intersection with BB′ corresponds to the graduation 100 sq. ft. and from this datum the scale of areas can be completed.

Developments at Birmingham

New trolley buses and refuse disposal works

THE City of Birmingham has for several years operated a single route of trolley-buses extending from the centre of the city through an industrial area to Nechells Green. The original four-wheeled trolley-buses are being superseded by six-wheeled trolley-buses with Brush bodies on A.E.C. chassis. The seating capacity is fifty-eight, twenty-five in the lower and thirty-three in the upper covered saloon.

The single 80-h.p. English Electric motor is mounted forward, power being transmitted to the rear axles by Spicer jointed propeller shafting. The rear axles are of the underslung worm type, offset to reduce the loading height. A special feature of the rear bogie is the spring torque blade which connects the two axles. A third differential operating through a hollow worm ensures the equal distribution of the driving power over both axles. The low frame height of 22½ in. combined with the exceptional frame width of 5 ft. (over the rear bogie) gives a low centre of gravity and provides stability over highly cambered roads.

The controller is foot operated, the contactor group being mounted in an asbestos lined steel case with removable cover, mounted in an easily accessible position in the driver's cab. Three types of braking are available—hand, electric and vacuum servo. The collector gear consists of two independent side-by-side insulated trolleys which allow a deviation by approximately 13 ft. on either side of the centre of the overhead wires. A trailing skate enables the buses when being taken to and from the sheds to use the tramway overhead line and rails.

The bodies supplied by the Brush Electrical Engineering Co., Ltd., have been built to the specification of Mr. A. C. Baker, general manager of the Birmingham Corporation Omnibus Department. The body framing is a combination of English ash and oak, and is strengthened by steel flitches and plates, and aluminium alloy castings at the intersection of the pillars and rails to give round corners to the windows. The exterior and the roof of the top cover panels are of sheet aluminium.

The interior woodwork is of walnut, and the side panels are of plywood covered with scratchproof rexine. Ventilation is provided by means of Quicktho drop windows, a "Brush" patent panel ventilator in the lower saloon, and "hit-and-miss" ventilators in the front of the top cover.

The staircase is carried inside the body, the stair handrails being of tubular steel, covered with black non-flam Doverite. The pole for removing the trolleys from the line is carried in a special pocket behind the near-side seats in the lower saloon. The driver's cab is carried the full width of the vehicle, and the forward end of the body has been specially designed to minimise wind resistance.

Two separate lighting systems are provided, the general lighting from the 500-V trolley circuit, and an emergency supply from a 12-V battery, which is charged by a dynamo driven from the cardan-shaft.

One of the new Birmingham trolley buses

Electricity from Refuse

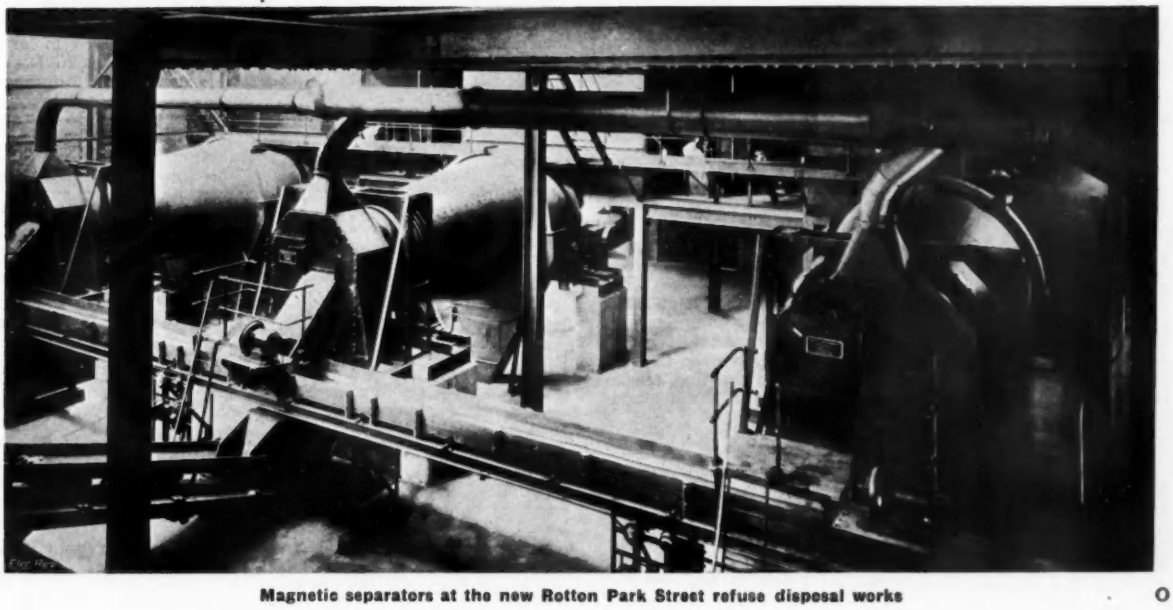
The new salvage and refuse disposal works at Rotton Park Street, Birmingham, have been built on the site of the old destructor at a cost of £124,000. The whole of the electricity required for driving machinery, cooking in the canteen, lighting the depôt, and charging the fleet of electric vehicles is produced from the refuse of the furnaces of the works.

The motors are of the d.c. shunt-wound interpole type, totally enclosed, and dust proof. The 7½, 15, and 30-b.h.p. machines have been standardised at 650 r.p.m., and the 5-h.p. machines at 720 r.p.m. The whole of the automatic starters are of the "C.M." push-button operated, non-reversing type for all motors except that of the shuttle conveyor, which is of the reversing type. The generating plant consists of two high-speed Belliss and Morcom two-crank compound condensing engines, each coupled to a Peebles compound-wound 200-kW, 470-V generator. It is estimated that electricity will be produced at 0.50d. per kWh, including 0.25d. per kWh capital charges.

The new works are the fourth erected by the Department in order to abolish tipping crude house refuse. The fifth scheme is the rebuilding and enlargement of the main works at Montague Street, at an estimated cost of £197,000, and the total cost of the five schemes is £560,000.

Messrs. Heenan and Froude, Ltd., Worcester, were the main contractors for the destructor plant, and Messrs. Bolton and Lakin, Ltd., for the inclined roadway, garages and buildings. The conception of the whole scheme is due to Mr. Jas. Jackson, manager of the Department. The United Electrical Co. (Birmingham), Ltd., was the main contractor for the generating plant, charging plant, balancers, and lighting installation; the principal sub-contractors were: Messrs. Belliss and Morcom, Ltd., engines and cooling plant; Messrs. Bruce Peebles and Co., Ltd., generators; and the Credenda Conduits Co., Ltd., lighting fittings.

The sub-contractors for Messrs. Heenan and Froude were: Rapid Magnetting Machine Co., Ltd., magnetic separators; Electric Control, Ltd., electric starting equipment; and the United Electric Co. (Birmingham), Ltd., power wiring.



Magnetic separators at the new Rotton Park Street refuse disposal works

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

The Scottish Ideal Home Exhibition

The electrical equipment and fittings of "The House that Jean Built," at the *Daily Mail* Ideal Home Exhibition, Glasgow, which closes on October 29th, reference to which was made in our last issue, were supplied by the General Electric Co., Ltd., in collaboration with Messrs. James Meighan & Son, Glasgow, while the polisher, sweeper and refrigerator were provided by Electrolux, Ltd. Among heating and lighting stands at the exhibition are the following:—A. Bell & Co., Ltd.; Crompton Parkinson, Ltd.; Falkirk Iron Co.; Wm. Kemp and Co.; Laidlaw, Drew & Co., Ltd.; Marshall & Co., Ltd.; Mitchell, Russell & Co., Ltd.; Samuel Smith & Sons, Ltd.; James Stott & Co., Ltd.; and Allan Arthur & Ure; Refrigerators are shown by Electrolux, Ltd., Robert N. Fairgrieve, and Vac-Tric, Ltd. Other exhibitors include:—Scottish Distributors; G. D. N. Ross; North British Electric Sundries Co.; Bulle Co., Ltd.; Singer Sewing Machine Co.; the British Vacuum Cleaner & Engineering Co.; Beatty Bros., Ltd.; Hoover, Ltd.; James Meighan & Son; Ideal Home Electrical Appliances, Ltd.; Tellus Electric Cleaner Co. (Scotland), Ltd.; Post Office Telephones and Telegraphs; British National Electrics, Ltd.

The North London Exhibition

The North London Exhibition is now running at the Alexandra Palace and will remain open until October 22nd. The firms of Hollands of Harringay and Mr. V. Anderson display a complete range of the latest types of radio sets and gramophones by the leading manufacturers. There are two North-Met. stands, the larger one being devoted to the heavier electrical domestic appliances, and ample room is provided for demonstration facilities. The apparatus shown here includes Belling, Jackson and Falco cookers, G.E.C. and Santon wash boilers, a G.E.C. washer and ironer, Ferranti water heaters, a Reyrolle washbasin, towel rails, B.T.-H. and Electrolux minor refrigerators and G.E.C. floor polisher. The stand is illuminated by twenty-two Benjamin "Projectolux" units, with 300-W lamps. On the other stand are shown smaller electrical appliances, including Berry, Belling and Ferranti fires, vacuum cleaners, irons, toasters, kettles, &c. A picture appears on p. 561. The electrical fittings in a show house built by G. Reed and Sons are of the type put in by the North Metropolitan Co., and include a Berry "Discus" radiator adjustable in any direction.

New North-Met. Showrooms

New showrooms for the North Metropolitan Electric Power Supply Co., Ltd., in Fore Street, Edmonton, were formally inaugurated on October 7th by the chairman of the local Council. Lord Ashfield, chairman of the company, in welcoming the chairman and visitors, stated that a supply was first provided in the district twenty-five years ago, when there were twenty-seven consumers. To-day there were over 8,000. Capt. J. M. Donaldson, the company's chief electrical engineer, briefly outlined the history and developments of the company in the district.

The new premises, a view of which is reproduced on p. 561, consist of a showroom, offices and stores, and the showroom has been partitioned off so that the various types of fittings and equipment can be shown in appropriate settings. There are two display windows, in which special lighting equipment has been installed to draw attention to the apparatus at night. The offices and showroom are heated by four different methods. The showroom itself is heated by the radiators which are displayed, while two of the side rooms are heated by the "Dulrae" system, thermostatically controlled. "Morganite" panel heating is installed in the stores, while the main part of the building is heated from an electrical hot water storage system.

Conditions in East Africa

A Department of Overseas Trade report on economic conditions in East Africa, Northern Rhodesia and Nyasaland, states that on the whole imports of electrical machinery and apparatus have been well maintained largely owing to extensions undertaken by the East African Power and Light Co., Ltd. The United Kingdom has tended to gain trade from foreign competitors and electric lamps of British manufacture are selling better than they have been for some years, although it is difficult to compete with cheap lamps of Japanese origin largely used in the bazaar trade. A gratifying feature is the increase in the proportion of radio apparatus imports from the United Kingdom. When the projected Empire broadcasting starts there will undoubtedly be a striking advance in the demand for radio receivers.

Electrical Production in America

Statistics published in the *Survey* of the National Electrical Manufacturers' Association relating to orders received by members during July last show considerable decreases in most cases as compared with the corresponding month of last year. Orders for a.c. electric motors (1-200 h.p.) in particular were $984,258 lower at $588,283, d.c. (1-200 h.p.), and fractional h.p. models falling from $377,129 to $149,407, and from $1,541,321 to $615,793, respectively. The state of the power switch equipment market appears to be in a still worse position, orders for indoor apparatus declining from $47,041 to $15,472, and for outdoor apparatus from $360,325 to $50,108. Electric furnaces (under 50 kW) were in demand only to the extent of $17,360, as compared with $57,365.

Radio Sets in Australia

Comparisons between the prices of Australian and other wireless receiving sets were made at a recent inquiry by the Australian Tariff Board. Mr. S. M. Grime, assistant manager of Amalgamated Wireless (Australasia), Ltd., said in evidence that but for the present protection the Australian market would be flooded with cheap foreign radio goods which were either the result of over-production or production by cheap labour. The substantial protection and prohibition had not brought about any tendency to lag behind progress made in other countries. In 1931 his company manufactured more than 12,000 receivers. In reply to a member of the Board, Mr. Grime said that receiving sets were being retailed at £37 10s. in Australia and the equivalent set on the American market was selling as low as $36, or about £7 10s. It was thought, however, that this American price was intended for the chassis only, and that valves, cabinet, and speaker were extra, which would bring the price to about the same as the Australian set. Other evidence showed that in New South Wales 40,000 sets were manufactured in 1931 and 14,000 sets in the first three months of this year. Mr. Charles Maclurcan, Australian representative of Messrs. A. C. Cossor, Ltd., urged that the duty on British battery kits should be reduced. The Australian market, he said, was filled with innumerable makes of American valves at prices so low that English manufacturers could not compete.

A Large Electric Cantilever Crane

With reference to the notice which appeared under this heading in our issue of September 30th, Messrs. Barker, Young and Co., Ltd., inform us that the control cabin of the crane is heated by means of approximately 30 kW of "Unity" thermostatically controlled electric heaters.

Brighton Radio Exhibition

The first radio exhibition organised in Brighton was held during the week ended October 8th at the Georgian Room, Regent Theatre building. There were thirty-one stands. Radio-Tricity, Ltd., Brighton, showed an a.c. to d.c. rotary convertor; Mr. H. J. Galliers exhibited the Baird television apparatus; Messrs. Page & Miles, Ltd., displayed a large range of "Dagenite" batteries, high and low tension; A. H. Strettle, Brighton, had a range of "Ever-Ready" batteries; and Messrs. Belling & Lee, Ltd., had an interesting show of terminals, fuses, and chokes.

The Night Sky Telegram

We have received a copy of a brochure issued by Sky Publicity, Ltd., Cromwell House, Surrey Street, W.C., giving particulars of a new method of projecting on the night sky by special searchlights advertisements and news-messages of important events which occur between 8 p.m. and midnight. The service is to be inaugurated within a few weeks.

French Import Restrictions

According to the *Board of Trade Journal*, the French *Journal Officiel* contains a series of orders, dated September 30th, fixing the quotas of various articles which are to be allowed to be imported into France during the period October 1st to December 31st. The quotas of electrical goods allotted to the United Kingdom are as follows: Dynamo-electric machines and industrial electric transformers, dry or in oil, 538 quintals; apparatus for cutting off, regulating, protecting, and distributing electricity, including distribution cables (a) non-automatic apparatus, 260 quintals, (b) automatic apparatus 395 quintals; electric heating apparatus, including stoves, "other countries," including United Kingdom, 238 quintals.

F.B.I. Memoranda

A memorandum has been prepared by the Federation of British Industries and submitted to the President of the Board of Trade, in which it expresses its views as to the principles which should guide the Government in the negotiation of trading agreements with foreign Powers.

The Federation has also forwarded to the Government a document entitled "Public Expenditure," which contains an indictment of excessive spending by the State and municipal authorities.

Courses in Arc Welding

Murex Welding Processes, Ltd., Ferry Lane Works, Forest Road, E.17, have issued a syllabus of training courses in electric arc welding which are given at the company's welding school. There are three courses: one for operators (14 days), one for designers (21 days), and another for supervisors (21 days).

Economic Conditions in Roumania

According to a recent report, issued by the Department of Overseas Trade on economic conditions in Roumania, the outlook at present is very uncertain, and business is being influenced by many factors which all tend to reduce activity. An early revival cannot be expected, unless the world prices for this country's products begin to show a considerable improvement.

The "Revo" Fire Brigade

The accompanying illustration shows the fire brigade of the Revo Electric Co., Ltd., which, through continually extending its factories on a 40-acre site, demands efficient protection from fire. The brigade is comprised of picked men, each highly trained in individual and team work under the leadership of Mr. W. Crighton, the captain. The latest fire-fighting appliances are included in the equipment, such as chemical extinguishers for the paint shops where very highly inflammable materials are used. The "Alarmex" system is employed to indicate simultaneously an outbreak of fire in the works to both the commissionaire's office and the captain's dwelling, and has proved very successful.

Fire fighters of the Revo Electric Co., Ltd.

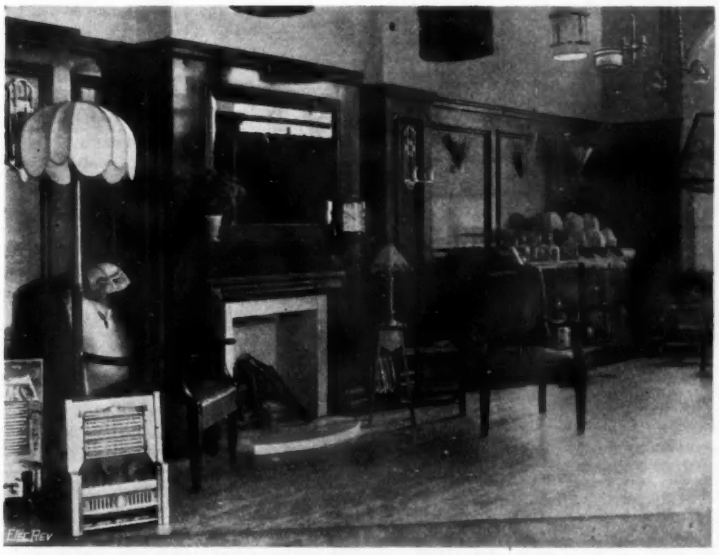
The Engineering Golfing Society

The autumn meeting of this Society was held over the course of the Berkshire Golf Club, Ascot, on September 29th.

In the morning there was an eighteen-hole medal round, and the "Hele-Shaw" scratch challenge cup and memento were won by Mr. F. I. Sutherland Gill with a score of 75. The handicap resulted as follows: The "F. J. Walker" challenge cup and memento, Mr. C. H. Hayward, 76+2=78; second prize, Mr. E. C. Mackeller, 86−7=79, after a tie with Mr. D. S. Allom (83−4). The "P. B. Brown" challenge cup and memento, Mr. L. Trewby, 95−12=83, after a tie with Mr. W. R. Manning (97−14), who took second prize. Prizes for the best first and second nine holes were taken by Messrs. D. S. Allom and M. J. D. Kerr respectively. In the afternoon there was an eighteen-hole round, foursomes against bogey, when the "Hadfield" challenge cups and mementos were won by Messrs. M. J. D. Kerr and E. S. New with 1 down; the second prizes went to Messrs. H. E. Midgley and Charles Stewart after a tie at 2 down with Messrs. H. V. Gaud and P. V. Hunter. There were forty-two competitors.

An Enamelled Wire Development

It is often useful to have enamelled wire packed on reels containing exact, or nearly exact, weights, and British Insulated Cables, Ltd., announce that they have developed a new method of dealing with orders which call for this. They can now supply wire on reels with only a slight plus or minus tolerance on weight. The tolerance will be quoted for when inquiries are received.



The latest showrooms of the Birmingham Corporation Electric Supply Dept. opened recently at King's Heath

Electric Heat for Airmen

In making a new world's aeroplane height record of approximately eight and a half miles—a figure now officially confirmed by the Royal Aero Club—Captain Cyril Unwin's' clothing, goggles and oxygen apparatus were warmed by electricity supplied by a generator. A large Exide battery was also carried for emergency use in the event of failure of the generator. It is stated that 100 deg. of frost was registered.

French Lamp Quota

According to the *Board of Trade Journal*, the lead-in wires and filament supports imported into France for the manufacture of incandescent lamps are not to be included within the scope of the quota restrictions affecting such lamps.

The Algerian Radio Market

The Algerian market for radio apparatus is of growing importance, but, says a Department of Overseas Trade report on the subject, the importation of United Kingdom goods has been hindered by high prices and Customs duties. The market for radio apparatus of other than French manufacture has recently been greatly restricted, as the French Government has extended to Algeria the system of limiting imports to fixed quotas.

Catalogues Required

Mr. T. H. M. Swinburne, of Ellesmere Road, Altrincham, asks for manufacturers' catalogues and price lists with particulars of wholesale terms.

Trade Announcements

The London office of the Better Lines Co. has been moved to 32, Shaftesbury Avenue, W.1.

Mr. Charles White, of 201, Upper Thames Street, E.C.4, asks us to state that he is not connected with the Charles White Electrical Co., Ltd.

Messrs. Wright (E.P.S.), Ltd., have appointed Messrs. Pendry & Williams, 92, Victoria Street, S.W., as their sole representatives for motors and dynamos in the London area.

For Sale

The Ministry of Finance, Northern Ireland, invite offers for panel type electric radiators.
(See our advertisement pages to-day.)

American Electrical Exports

The United States Government has issued returns of the country's external trade during the fiscal year ended June 30th last. They show that exports of electrical machinery and apparatus fell in value during that period by about one-third compared with the previous twelve months, the figures being $62,759,000, against $99,035,000. The only important items in the electrical group which rose in value were a.c. generators, accessories and parts for generators, and power transformers over 500 kVA. Decreases of 50 per cent. or over, compared with the previous fiscal year, were recorded in the value of the exports of d.c. generators, steam turbine generator sets, self-contained lighting outfits, transformers other than power, switchboard panels, meters, motors, starters and controllers, portable electric tools, refrigerators, household washing machines, telephone apparatus, and lighting fixtures. Figures relating to exports of radio apparatus during the year under review are as follows, the previous twelve months' trade being shown in parentheses:—Transmitting sets, valves and parts, $755,000 ($892,000); receiving sets, $11,720,000 ($13,799,000); receiving valves, $1,879,000 ($2,102,000); receiving set components, $3,564,000 ($4,358,000); loud speakers, $758,000 ($1,362,000); and other receiving set accessories, $420,000 ($1,841,000).

Subway Lighting in Paris

In connection with the article on this subject in our last issue, we are asked to mention that the installation was carried out by the public lighting department of the Compagnie Parisienne de Distribution d'Électricité, and that the special switchboard equipment was supplied by the Société Télémécanique Electrique, of Nanterre.

The Prescot Copper Refinery

Our readers will remember the announcement, made in these columns a few months ago, that a new refinery was to be erected at Prescot, Lancs., by British Copper Refiners, Ltd. This will be the first of its kind in this country. We are now able to publish a photograph showing work proceeding on the site, from which it will be evident that considerable progress has already been made. It is expected that the plant will be in production towards the end of this year. The site measures roughly 100 yards square and is close to Prescot Station, a system of sidings connecting it with the L.M. & S. Liverpool-Wigan line.

The British Copper Refiners' works in course of erection

The Clinker Premium

A scheme for the award of an annual premium by the Rugby Engineering Society for the best original paper submitted has been evolved by a small committee of the late Mr. R. C. Clinker's intimate associates. Mr. Clinker was a past president of the Society, and took the keenest interest in its activities, and was always to the fore in fostering and encouraging education and the acquisition of knowledge. The sum subscribed is sufficient to ensure a premium of approximately £4 15s. being available annually. This sum was handed to the trustees of the memorial to be invested as directed by the Clinker Memorial Committee. The number of subscribers to the fund is 238, a remarkable tribute to the esteem and affection in which Mr. Clinker was held. The ceremony of handing over the money and the deeds took place at a meeting of the Rugby Engineering Society on October 5th. It was performed by Mr. A. P. Young, O.B.E., who delivered an address dealing with the work and life of Mr. Clinker.

The Manchester Electrical Engineers' Dance

The Manchester Electrical Dance Committee has decided to hold this year's dance at the Midland Hotel, Manchester, on December 16th.

A Siemens Demonstration Van

A recent innovation of Siemens Electric Lamps & Supplies, Ltd., is the provision of a specially fitted motor car for displaying a representative range of "Xcel" electric domestic appliances. This car is touring Great Britain calling on all classes of the trade in all the large towns, accompanied by a special representative, enabling customers to see at first hand the company's latest fires, tube heaters, cookers, &c. The appliances are tastefully arranged on shelves and customers are able to thoroughly inspect them. The accompanying illustration shows the interior of the van.

Interior of a Siemens van

Registered Electrical Contractors

Applications for registration from the following were accepted by the Executive Committee of the National Register of Electrical Installation Contractors at its last meeting:—

Ward, H., Bournville.
Simpson Worsley, Manningham, Bradford.
Baldwin, R., Coleshill, near Birmingham.
Swift, H. J., & Co., Earlestown.
Charters, C. H., Warrington.
Hudson, H., & Co., Waterloo, Liverpool.
Richardson, C., & Sons, Romiley, near Stockport.
Foote, D., Droylesden, Manchester.
Urmston Electrical Co., Urmston.
Smith & Crawford, London, W.1.
Miller Bros., Doncaster.
Milton, A. V., & Co., Liverpool.
Gilbert Lewis Electrical Co., Acocks Green, Birmingham.
Taylor, J. H., Manchester.
Hogg, J. N., Liverpool.

At the same meeting two applications were withdrawn and twelve were declined.

Irish Free State Electrical Imports

A quiet tone prevailed in the electrical trade in the Irish Free State during August, the imports of electrical machinery, fittings and apparatus during the month amounting to £41,097. The total for the eight months ended with August last is, however, slightly in advance of the figures for the corresponding period of last year. The details of the eight months' imports are appended:—

	January–August. 1931.	1932.
	£	£
Electrical machinery	126,097	123,451
Electric wires and cables	62,382	82,231
Wireless sets and parts	59,358	103,790
Electric lamps and parts	38,891	30,857
Other electrical goods	124,756	91,425
Copper wire	14,945	6,380
Total	£426,429	£438,134

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

CHEMICALS, Etc.	Price Oct. 12th.	Fortnight's Inc. or Dec.
a Acid, Oxalic ... per cwt.	50s.	—
a Ammoniac, Sal ... per ton	£40	—
a Ammonia, Muriate (large crystal) ... ,,	£38	—
a Borax ... ,,	£17	—
a Copper, Sulphate ... ,,	£17	—
a Potash, Chlorate ... per lb.	3¾d. to 4¼d.	—
a ,, Perchlorate ... ,,	6d.	—
a Shellac T.N. ... per cwt.	£3 15s.	—
a Sulphur Commercial ... per ton	£11	—
a ,, Roll ... ,,	£11	—
a Soda Chlorate ... per lb.	3½d. to 3¾d.	—
a ,, Crystals ... per ton	£5 to £5 5s.	—
a Sodium Bichromate, casks ... per lb.	4d.	—
METALS, Etc.		
b Aluminium, Ingots ... per ton	£100 to £105	—
b ,, Wire ... per lb.	1/1 to 1/9	—
b ,, Sheet and Foil ... ,,	1/2 to 2/9	—
p Babbits Metal and Anti-friction Metals—		
Grade I ... per ton net	£142	£4 dec.
Grade II ... ,,	£100	£1 dec.
Grade III ... ,,	£55	—
c Brass (rolled metal 2" to 12" basis) ... per lb.	7¼d.	¼d. dec.
c ,, Tubes (solid drawn) ... ,,	9¼d. to 9½d.	—
c ,, Wire, basis ... ,,	7⅝d.	¼d. dec.
c Copper Tubes (solid drawn) ... ,,	10½d.	—
g ,, Bars (best selected) ... per ton	£68	—
g ,, Sheet ... ,,	£68	—
g ,, Rod ... ,,	£68	—
g ,, (Electrolytic) Bars ... ,,	£36 5s.	—
d ,, ,, Sheets ... ,,	£64	—
d ,, ,, Wire Rods ... ,,	£42	—
d ,, ,, H.C. Wire ... per lb.	6⅝d.	⅛d. dec.
f Ebonite Rod ... ,,	1/3 to 1/6	—
f ,, Sheet ... ,,	1/3 to 1/6	—
n German Silver Wire ... ,,	2/2	—
k Gutta-percha, fine ... ,,	nom.	—
k India-rubber, Para fine ... ,,	5½d.	½d. inc.
i Iron, Pig (Cleveland No. 3) ... per ton	58/6	—
i ,, Wire, galve. No. 1, P.O. qual. ,,	£20	—
g Lead, English pig ... ,,	£13 15s.	£1 dec.
g Mercury ... per bot.	£9 5s. to £9 10s.	2s. 6d. dec.
e Mica (in original cases) small ... per lb.	6d. to 8/6	—
e ,, ,, medium ... ,,	4/– to 8/–	—
e ,, ,, large ... ,,	8/6 to 17/6 & up	—
p Phosphor Bronze, plain castings ... ,,	1/1d.	—
p ,, ,, drawn bars & rods ,,	10⅝d.	½d. dec.
p ,, ,, rolled strip & sheet ,,	10½d.	½d. dec.
p ,, ,, wire ... ,,	11⅛d.	½d. dec.
o Platinum ... per oz.	£9 5s.	—
d Silicium Bronze Wire ... per lb.	7⅛d.	⅛d. dec.
r Steel, magnet, in bars ... ,,	7½d.	—
g Tin, Block (English) ... per ton	£150 10s. to £152 10s.	£2 dec.
n ,, Wire, Nos. 1 to 16 ... per lb.	3/1	—

Quotations supplied by:—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India-Rubber, Gutta-Percha and Telegraph Works Co. Ltd.
g James & Shakespeare.
h Edward Till & Co.
i Bolling & Lowe.
l Richard Johnson & Nephew, Ltd.
n P. Ormiston & Sons.
o Johnson, Matthey & Co.
p C. Clifford & Sons, Ltd.
r W. F. Dennis & Co.

New Catalogues and Lists

British Aluminium Co., Ltd., Adelaide House, King William Street, E.C.4.—An illustrated brochure entitled "Industrial Problems Lightened with Aluminium."

Aerograph Co., Ltd., Lower Sydenham, S.E.26.—A catalogue relating to "Aerograph" and "De Vilbiss" spray painting and finishing equipment.

Walter's Electrical Manufacturing Co., Ltd., Kensal Road and Conlan Street, W.10.—Lists Nos. S.G. 20, 50 and 70, dealing respectively with "Wemco" voltmeter switches, quick break knife switches and air-break circuit breakers.

Austin Walters & Son, Ltd., Little Peter Street, Manchester.—An illustrated catalogue dealing with all kinds of neon and other signs.

Varley (Oliver Pell Control, Ltd.), 103, Kingsway, W.C.2.—A catalogue of radio components, together with a number of instructional leaflets and a brochure on the latest Varley receivers.

Cement Marketing Co., Ltd., Portland House, Tothill Street, S.W.1.—A booklet entitled "Something New in Coloured Dustless Floor Surfacing for Industrial and Domestic Buildings."

King's Signs, Ltd., Sunbeam Road, Park Royal, N.W.10.—A list of illuminated window and other signs.

Hobday Brothers, Ltd., 21, Great Eastern Street, E.C.2.—A 136-page catalogue of general electrical goods and appliances and contractors' supplies.

S. Wolf & Co., Ltd., 115, Southwark Street, S.E.1.—Lists illustrating the new "Wolf" heavy duty portable electric drilling machine of ½-in. capacity, and a screwdriving and nut setting tool.

M. & C. Switchgear, Ltd., Kelvinside Works, Kirkintillock, Glasgow.—Pamphlets Nos. G 11/3 and G 21/1 dealing respectively with disconnecting link boxes and mining type plugs and sockets.

Higgs Motors, Witton, Birmingham.—A card indicating for service purposes the distances between thirty-eight of the principal towns in Great Britain.

Clay Cross Co., Ltd., near Chesterfield.—An illustrated leaflet drawing attention to a reduction in the price of "Clay Cross" economisers.

Davidson & Co., Ltd., Sirocco Engineering Works, Belfast—A brochure giving particulars of some of the more important "Sirocco" equipment, including draught fans, air heaters, dust collecting plant, pneumatic conveyors and tea machinery.

John Moores & Co., Ravald Street Works, Salford.—The new season's catalogue (88 pages) of radio receivers and apparatus.

Donovan & Co., 46, 47 and 48, Great Charles Street, Birmingham.—Publication No. 3291, illustrating and describing the "Donlok" switch plugs.

Snow's, 247, Shakespeare Road, Herne Hill, S.E.24.—An illustrated list containing particulars of lead-headed wall nails.

Typerlite Co., 36, Cannon Street, E.C.4.—A catalogue of "Typerlite" adjustable lighting fittings.

Ateliers de Constructions Electriques de Charleroi, Victoria Street, S.W.—The October price list of motors, transformers, &c.

T. B. T. Electric Co., Ltd., 171, Queen Victoria Street, E.C.4.—Lists Nos. 63 and 33, dealing respectively with self-contained electric pulley blocks and centrifugal house service pumps.

Revo Electric Co., Ltd., Britannia Works, Tividale, Tipton, Staffs.—Catalogue No. H.21 of Revo electrical products, including cookers, fires, water heaters, street lighting equipment, &c. Also an illustrated and priced folder of fires.

Bankruptcy Proceedings

A. J. Brookes, electrical contractor, 36, North End Road, Golders Green, N.W.—This debtor has lodged accounts at the London Bankruptcy Court showing liabilities of £1,689, against assets of £69. The following are the principal creditors: Falk, Stadelmann & Co., Ltd., £572; Lehraid, Ltd., £99; J. T. Cartwright & Sons, Ltd., £168; Brown Bros., Ltd., £54; Wenham Lighting Corpn., £90; Stern Electric, Ltd., £60; Wholesale Electric Co., Ltd., £147; General Electric Co., Ltd., £69; Hobday Bros., Ltd., £56.

Rosedale Salons, Ltd., wireless dealers, 25, Finsbury Square, E.C.—The accounts filed under the compulsory liquidation of this company show: Unsecured creditors, £3,063; debenture claim, £502; assets, £820; and a deficiency of £3,245, with regard to contributories. The failure is attributed to lack of trade owing to trade depression, competition of "cut price" shops, small margin of profit on goods sold, heavy expenses, and loss through fire.

E. Gould (lately trading in partnership as Gould & Co.) electrical and radio engineer, High Street, Lee-on-the-Solent.—This debtor attended at the Court House, St. Thomas's Street, Portsmouth, on October 3rd, for his public examination. His statement of affairs disclosed liabilities of £646, while assets were estimated to realise £113, leaving a deficiency of £533. The debtor attributed his failure to heavy overhead charges and losses on contracts through under-estimating.

F. W. T. Mussett, 31, Spring Bank, Kingston-upon-Hull, trading as "The Ferensway Electrical Co.," electrician.—The first meeting of the creditors was held on October 6th at the Official Receiver's Office, 37, Scale Lane, Hull, when the statement of affairs showed liabilities of £277 and assets of £113, leaving a deficiency of £164. The debtor attributed his failure to insufficient business. The matter was left in the hands of the Official Receiver as trustee.

T. G. H. Wiley (Wiley & Co.), electrical engineer, Bradford Road, Stanningley.—Last day for receiving proofs for dividend October 21st. Trustee, Mr. J. O. Morris, 71, Manningham Lane, Bradford, Official Receiver.

T. H. D. Pope, electrical engineer, 119, Commercial Road, Swindon.—Receiving order made September 29th on debtor's own petition. First meeting October 17th and public examination October 26th, both at the County Court Buildings, Swindon.

J. E. Connell, electrical engineer, 2, Russell Street, Downing Street, Manchester.—Application for discharge to be heard on October 31st at the Court House, Quay Street, Manchester.

T. S. S. Southwood, electrical engineer, Pound Farm, Whyke Road, Chichester.—Last day for receiving proofs for dividend, October 18th. Trustee, Mr. R. W. Cave, 8, Old Steine, Brighton, Official Receiver.

Company Liquidations

Lectra-Ray Products, Ltd., electric comb and brush manufacturers, etc., 3, Fleet Lane, E.C.4.—The statutory meeting of creditors was held on September 28th at the above address, when Mr. Mignon, a director, presided, and said that at a meeting of the shareholders held previously a resolution had been passed nominating Mr. W. G. Wooldridge, of Messrs. Chantrey, Button & Co., as liquidator of the company. A statement of affairs as at September 27th showed a deficiency of £1,550. The position had been brought about mainly owing to the acute trade depression and to the publicity which had been given to a recent legal action in which the proprietors of an electric comb business were concerned in regard to their guarantee. A resolution was passed appointing Mr. Wooldridge and Mr. G. M. Cantrey, Imperial House, Holborn Viaduct, E.C., joint liquidators, with a committee of inspection consisting of the representatives of three of the creditors.

Wardus Radio, Ltd., 332, Balham High Road, London, S.W.17.—The statutory meeting of the creditors was held on October 4th, when a statement of affairs was submitted showing liabilities of £714 and net assets of £234. The company was registered on February 12th, 1932, and accounts prepared to August 31st last showed that for the six months the trading resulted in a loss of £369. The position was attributed to depression in trade and lack of capital. Mr. Wallace Hepburn, 1 & 2, Bucklesbury, E.C., was appointed liquidator, with a committee of inspection.

Radio & Cabinets, Ltd.—Winding up voluntarily. Liquidator, Mr. M. Andrews, 4, High Street, Sutton. Meeting of creditors October 10th at 5a, Carshalton Grove, Sutton.

C. A. Middleton, Ltd.—First and final dividend of 2s. in the £. Liquidator, Mr. E. H. Hawkins, 4, Charterhouse Square, E.C.

Clay Cross & District Electric Supply Co., Ltd.—Winding up voluntarily. Liquidator, Mr. J. Steen, Clay Cross.

Hydro-Electric Power & Public Service Trust, Ltd.—Meeting, November 7th, at 1, Leadenhall Street, E.C., to receive an account of the winding-up by the liquidator, Mr. C. Reid.

Cranleigh Gas & Electricity Co., Ltd.—Meeting, November 7th, at 97-99, Cheapside, E.C., to receive an account of the winding-up by the liquidator, Mr. H. Lakeman.

Medway's Safety Lift Co., Ltd.—Winding up voluntarily. Liquidator, Mr. F. Poole, 10, St. Swithin's Lane, E.C.

Radio Retailers, Ltd.—Winding up voluntarily. Liquidator, Mr. S. G. Crimes, 150, Southampton Row, W.C.

S. G. Brown, Ltd.—Winding up voluntarily. Liquidator, Mr. R. M. Peat, 11, Ironmonger Lane, E.C.

Betta Electric Motors, Ltd.—Winding up voluntarily. Liquidator, Mr. P. E. Slack, 44, Bedford Row, W.C. Particulars of claims to the liquidator by November 16th.

Private Arrangements

F. D. Phillipps, electrical contractor, &c., 8, Mount Street, Liverpool.—The creditors met recently at the offices of Mr. P. S. Booth, Exchange Chambers, Bixteth Street, Liverpool. The statement of affairs showed ranking liabilities of £1,570 and assets totalling £315. After allowing £54 for preferential claims, the net assets were £261, leaving a deficiency of £1,308. It was stated that the cash claims would be withdrawn provided the matter was dealt with under a deed of assignment. Resolutions were passed confirming the deed of assignment already executed to Mr. Booth, and a committee of three of the creditors was also appointed. The following are the principal trade creditors:—Baxendale & Co., Ltd., £306; Downes & Davies, £163; the General Electric Co., Ltd., £160; and Edison Swan Electric Co., Ltd., £55.

C. M. Simpson (trading as C. M. Simpson & Co.), wholesale electrical supplier, 55, Frogmore Street, Bristol.—A meeting of creditors was held recently at the offices of Messrs. E. T. Collins & Son, 28, Baldwin Street, Bristol, when the statement of affairs showed liabilities of £2,095, of which £1,077 was due to the trade and £940 to cash creditors. The net assets were £1,473, leaving a deficiency of £622. The position was attributed entirely to losses on trading. It was decided that the debtor should execute a deed of assignment to Mr. Arthur Collins as trustee, that cash claims to the extent of £940 should be withdrawn, and that the debtor's friends should be asked to guarantee any deficiency for the payment of 20s. in the £ to the trade creditors. The following are the principal creditors:—A. C. E. C., £248; Clarke & Son, £129; Electrical Components, £94; Midland Electric Manufacturing Co., Ltd., £62; and Sperryn & Co., £50.

L. K. Horsfall, deceased, lately trading as Crabtree & Co., Queen Square Chambers, Woodhouse Lane, Leeds, radio dealer, &c.—At a meeting of the creditors the statement of affairs showed ranking liabilities of £586 and net assets of £204, leaving a deficiency of £382. It was stated that the debtor died on September 16th, 1932. He took over the business in November, 1929, and it was understood that the purchase price was £150, of which £100 was borrowed from a relative. The debtor also held an agency up to the time of his death. The business had suffered through his ill-health. No offer was submitted, and the opinion was expressed that the best way to deal with the estate would be for the executrix to agree to the estate being administered under a deed of assignment to Mr. C. H. Baker, Standard Buildings, City Square, Leeds.

Winding-up Petition

Beam, Ltd.—A petition for the winding-up of this company has been presented to the High Court by Siemens Electric Lamps & Supplies, Ltd., and will be heard in London on October 17th.

Dissolutions of Partnership

Redstone Electrical Co., electrical engineers and contractors, 86, Kingston Road, Merton, S.W.—Messrs. R. V. Redfearn and J. C. Hardstone have dissolved partnership. Mr. Hardstone will attend to debts and carry on the business.

Malcolm & Stewart, dealers in electrical and wireless supplies, 491, Alum Rock Road, Saltley, Birmingham.—Messrs. K. C. Payne, M. R. Horne and D. S. Horne have dissolved partnership. Messrs. M. R. and D. S. Horne will attend to debts and carry on the business.

Electricity Supply

Lighting, Domestic, Power

Accrington.—REDUCED CHARGES FORECAST.—Ald. Lambert stated at a recent meeting of the Town Council that a special committee had been deputed to consider the question of revising electricity charges. They thought it possible to reduce the charges for the coming year.

Attleborough.—SUPPLY TO INSTITUTION.—The Norfolk County Council is arranging for the Norwich Corporation's electricity supply to be extended to the Attleborough Institution. The County Council is to bear part of the cost of a service main (including the taking of the cable into the building), estimated at £100; and there is to be a fixed charge for electricity of £65 per annum, plus 1d. per kWh for all energy consumed. In addition the Corporation will change lamps, repair faulty wiring, &c., at an estimated cost of £49.

Balfron.—SUPPLY FROM THE GRAMPIANS.—A joint branch line from the Grampian Electricity Supply Co.'s main cable from Aberfoyle to Balfron will be erected for the supply of electricity to Gartmore House and Gartmore village. It is expected that the supply will be available before the end of the year. At Gartmore House, the residence of Sir August Cayzer, Bt., the company's supply will replace a private installation which has been in use for about 30 years.

Barndon (Co. Durham).—STREET LIGHTING.—The Urban District Council has signed a contract with Messrs. Straker and Love, colliery owners, for a supply of electricity for street lighting for Langley Moor.

Barrow-in-Furness.—EXTENSIONS.—The Corporation is to extend supplies to Lakeside, Field Broughton and Bardsea at a cost of £1,257. Further village extensions are under consideration.

Bath.—LOAN.—The City Council has received sanction to a loan of £5,845 for new coal-handling plant for the electricity works, and for extensions of distributing mains.

STREET LIGHTING CHARGES.—The charge for lighting and maintaining each 100 c.p. public street lamp has been reduced from £3 5s. to £3 per annum, and for high-power lamps from £8 15s. to £8 10s. per annum.

Birkenhead.—REQUEST FOR LOWER CHARGES.—Pressure is being brought to bear on the Electricity Committee to introduce lower electricity charges in certain of the outlying areas. The Bebington and Bromborough Council contends that the additional charges of 25 per cent. over borough rates for electricity supplies in Bebington and Bromborough should be abolished. The Committee has asked the electrical engineer to furnish a report on the matter.

Blackburn.—ABOLITION OF WAR-TIME INCREASE.—The war-time increase of 10 per cent on electricity is to be abolished as from January. Councillor C. A. Critchley, chairman of the Electricity Committee, stated at the Town Council meeting on October 6th, that the department made a profit of £6,998 last year. Some of that was spent for capital purposes, and the profit was reduced to £1,093. If they continued with present charges they would have a profit of £4,500 or £5,000 at the end of the year. By deducting the 10 per cent. they would have a fall of about £5,000 in revenue, but they would have a balance because of the reduction in tax.

ELECTRIFICATION OF DESTRUCTOR.—The Corporation Cleansing Committee is carrying out the electrification of Audley destructor works.

CHANGE-OVER.—The Electricity Department is expending a further £1,000 on the change-over from d.c. to a.c.

RATEABLE VALUE SYSTEM EXTENDED.—The Committee has extended the domestic rateable value system to farms and farm buildings, electricity being supplied at the special rate of 1d. per kWh.

Bridlington.—PRICE REDUCTIONS.—The Corporation Electricity Committee has recommended a reduction in the lighting charge from 6d. to 5½d. per kWh up to 500 kWh per quarter, for those using 1,000 to 1,500 kWh from 5½d. to 5d. per kWh, and for heating and cooking and other domestic power a reduction from 1d. to ¾d. per kWh.

Bryn (Port Talbot).—INAUGURATION OF SUPPLY.—This village, which is on the outskirts of Port Talbot, was lighted by electricity last week after fifty years of oil lamp lighting. The total cost of the scheme was in the neighbourhood of £5,500, and the contractors were Messrs. Johnson & Phillips, Ltd. The supply was switched on from the new power house on Saturday night by Ald. Richard Evans of the Port Talbot Corporation.

Buckie.—NEW SET STARTED UP.—The new generating set installed by Messrs. Mirrlees, Bickerton & Day, Ltd., at the power station was formally started up on October 5th by Mrs. Merson, wife of the Provost. Provost Merson said that when they opened the station they did not expect to require another engine this year, nor did they expect that the price of electricity would be reduced before the year was out. They had, however, reduced the price from 8d. to 7d. per kWh.

Burnley.—CHANGE-OVER.—The Town Council has authorised application to the Electricity Commissioners for sanction to borrow £20,000 to meet the estimated expenditure of the change-over from d.c. to a.c. to March 31st, 1935.

Cheltenham.—EXTENSION OF SUPPLY.—At a recent meeting of the Electricity Committee, the borough electrical engineer reported requests for a supply of electricity in the Crickley Hill district and submitted a scheme for extending the mains at a cost of £1,366. This extension would facilitate the future extension to Birdlip Village. He had also received an inquiry from Mr. E. Hicks-Beach for a supply of electricity to Witcombe Park and he was asked to submit a complete scheme for the Crickley Hill district, Birdlip Village and Witcombe Park.

Continental.—FRANCE.—The first stage of the 150,000-kW hydro-electric station in Alsace, *The Times* states, has been completed with the erection of a barrage across the Rhine which raises its level by 23 ft. It is divided into five basins with electrically operated sluices. The Kembs canal is 3¾ miles long and 39 ft. deep and is divided for some distance into two sections, one serving a lock and the other supplying water to the power station. The power station is expected to be completed within a year and its output of 700 million kWh per annum is to be transmitted throughout the whole of Eastern France and to Paris. The cost of the work to date (much of which has been carried out on account of reparations in kind from Germany) is £5,200,000 (gold). Mr. René Koechlin, an Alsatian, is responsible for the plan and its execution.

RUSSIA.—The Dnieprostroi power station, Ukraine, a description of which appeared in our issue of September 16th last, was formally inaugurated on October 10th.

Doncaster.—MAINS AND SUB-STATION EQUIPMENT.—The Town Council has applied for sanction to a loan of £4,274 for mains and services for 250 houses on the Intake Estate, and for extensions of equipment in existing sub-stations.

Dover.—LOAN SANCTIONED.—The Electricity Committee has received sanction to a loan of £3,000 for unspecified services.

Dumfries.—ALL-ELECTRIC HOUSES.—The Corporation Housing Committee and the electricity manager have inquired into the possibilities of making ninety-three new houses, to be built at Maxwelltown, all-electric. At the last meeting of the Corporation the Convener stated that they were reluctantly obliged to report that the project was not feasible. The price arrived at was remarkably low, and there was every indication that in the very near future Dumfries would be able to emulate Clydebank, where the charge was ¾d. per kWh, and Irvine (Ayrshire) where it was ½d. per kWh.

LOAN.—Application is being made by the Corporation for sanction to a loan of £7,500 to meet capital expenditure on meters, sub-station equipment, mains and services for the ensuing two years.

NEW CABLE.—The Electricity Committee has been authorised to purchase cable at an estimated cost of £250.

East Grinstead.—ALL-IN TARIFF.—The Urban District Council has adopted an all-in domestic tariff, consisting of a fixed quarterly rental of 3s. 6d. per room (certain classes of rooms exempted) and a "unit" charge of 1d.

STREET LIGHTING.—Mr. J. B. Morgan, the town's electrical engineer, informs us that all the street lighting in East Grinstead has now been converted to electricity.

Falkirk.—ELECTRICITY COMMISSIONERS' DECISION CRITICISED.—Treasurer Moffat, Falkirk, addressing a meeting of ratepayers on October 6th, criticised strongly the refusal of the Electricity Commissioners to grant the powers sought by the Corporation to increase the generating plant at the electricity works. In Falkirk to-day, he said, they were generating and supplying electricity for lighting at the low rate of 3d. per kWh. The Town Council did not propose to let matters rest, and would press its claim for new plant.

Guildford.—PROPOSED EXTENSION OF SUPPLY.—The Corporation Electricity Committee is considering the provision of a supply to the districts of Unstead and Tilthams Green.

Halifax.—SUB-STATION EQUIPMENT.—The Town Council has received sanction to a loan of £10,000 for sub-station equipment.

Harwich.—SPECIAL ORDER.—The Corporation has applied to the Electricity Commissioners for a Special Order to extend the area of electricity supply so as to include a portion of the parish of Ramsey in the rural district of Tendring.

Hebden Bridge.—REVISED CHARGES.—The Urban District Council has revised the scale of charges for electricity, and the charges have now been reduced to pre-war rates.

Hull.—NEW BATTERY.—At a recent meeting of the Electricity Committee, the engineer reported that the existing battery at Sculcoates power station was nearing the end of its useful life. In addition, it was not large enough for the purpose for which it was installed originally in 1907. He recommended that two new batteries should be obtained and placed in commission. The estimated total cost would be about £2,339. The proposal was approved.

LOAN.—The Committee has obtained sanction to the borrowing of £100,000 for expenditure on unspecified mains and services.

India.—INDUSTRIAL ELECTRICAL DEVELOPMENT.—To encourage the adoption of electric drive in factories in the districts served by the Pykara hydro-electric project, the Madras Government is making three- and five-year loans to industrial plants for conversion purposes. The cost is being assessed on a sliding scale, ranging from 120 rupees per h.p. for 10-h.p. in-

stallations to 60 rupees per h.p. for 1,000-h.p. installations. The recipients of loans are to pay 1¼ annas per kWh, and to agree to a minimum use of energy.

Ilford.—MAINS AND SUB-STATION EQUIPMENT.—The Electricity Committee has obtained sanction to a loan of £13,550 for mains and sub-station equipment.

LOANS.—The Electricity Committee is to apply for sanction to a loan of £50,000 for mains and services, £5,000 for apparatus for hire, and £1,000 for transformers.

Japan.—HYDRO-ELECTRIC UNDERTAKINGS IN KOREA.—Thirty-five applications have been received by the Korean Government for permission to establish hydro-electric undertakings in Korea. It is expected, however, that most of them will be rejected. The most important ones mentioned are those of the Korean Electric Industrial Co. (capital 30,000,000 yen), the Korean Electric Power Co. (capital 50,000,000 yen), the Korean Nitrogenous Manure Co. (capital 50,000,000 yen), the Seoul Electric Co. (capital 19,000,000 yen), the Korean Railway Co. (capital 17,200,000 yen), and the Korean Central Hydro-electric Co. (capital 10,000,000 yen).

Keighley.—CONCESSION TO LARGE CONSUMERS.—The Electricity Committee has decided to reduce the basic prices to large low-pressure consumers as follows:—Where the annual consumption is between 24,000 and 36,000 kWh. a reduction of 0.125d. per kWh; above 36,000 kWh. a reduction of 0.25d. per kWh.

Kingston-on-Thames.—THE CORPORATION AND BATTERY CHARGING.—At a recent meeting of the Town Council, the Electricity Committee reported that it had decided to continue the charging of batteries at the electricity works, but that if the practice was making it difficult for any trader to run his business the Committee would be quite prepared to revise the charges.

Largs.—SUCCESS OF ILLUMINATIONS.—In view of the success of the illuminations of the burgh, the Town Council is to consider a scheme of illuminations for future summer seasons. The capital cost of the project will be over £2,000.

Leeds.—COOKER AND WASH-BOILER PROPOSAL.—The Electricity Committee has appointed a sub-committee to interview the Sutton trustees with respect to a proposal to install electric cookers and wash-boilers in houses to be erected on an estate off Selby Road.

SUB-STATION EQUIPMENT.—Application is to be made by the Electricity Committee for permission to borrow £30,000 for sub-station equipment.

Malvern.—EXTENSION OF SUPPLIES.—The Urban District Council has decided to extend the supply to Upper Welland at an estimated cost of £840, and to Upper and Lower Chase Roads at an estimated outlay of £380.

Manchuria.—STATE ELECTRICITY SCHEME.—The Manchurian Republic has decided to proceed with the execution of the plans of developing industries by means of national control. Among the principal plans is the development of the electric power industry. The supply by the power plants of the South Manchurian Railway Company at various places in Manchuria is regarded as insufficient and consequently the Government proposes to establish State power plants at many places. The first will probably be established in the neighbourhood of Kirin, and will utilise the power of a river to the north of that town.

Montgomery.—PROGRESS OF ELECTRICITY SCHEME.—The work in connection with a supply of electricity has been completed up to the entrance of the town, and it has been arranged that underground cables shall be laid through the streets. The Town Council has offered the use of the Town Hall to the supply company and firms undertaking installation work for a display and demonstration of electrical appliances.

Nelson.—LOAN.—The Town Council has authorised application to the Electricity Commissioners for sanction to a loan of £1,839 for a sub-station with necessary switchgear and h.p. and l.p. mains for Southfield district.

Northern Ireland.—SMALL TOWNS ASK FOR A SUPPLY.—A number of small towns in Down and Tyrone are applying to be linked up with the Northern Ireland electricity scheme both for lighting and power. A Co. Down mill has just been started on electric power, being the first of its kind in that part of the country.

Norwich.—RURAL ELECTRIFICATION.—The Electricity Committee is to complete its scheme for the intensive development of the rural demonstration area at a cost of £14,745.

SWITCHGEAR ALTERATIONS.—Sanction is to be sought to loans of £9,140 and £1,198, respectively, for additions to switchgear at Duke Street and King Street sub-stations.

LOANS.—Sanction is being sought to loans of £100,000 for mains and services, and £30,000 for transformers, etc.

INAUGURATION OF PLANT EXTENSIONS.—The second extension to the Corporation's power station at Thorpe will be formally inaugurated on October 27th.

Penmaenmawr.—TUNNEL LIGHTING.—The local Council having considered the report of Mr. E. Price White, the consulting engineer to the Council, with reference to the lighting of the Penmaenbach tunnel, has decided to adhere to its original intention to provide a transformer kiosk at a cost of £1,330 and to supply electricity at 1½d. per kWh.

Ross.—SUPPLY ARRANGEMENTS.—It is understood that arrangements have been completed with the Ross Electric Light and Power Co., Ltd., whereby the Shropshire, Worcestershire and Staffordshire Electric Power Co. is now associated with the management of the undertaking serving the urban district of Ross. Negotiations between the two companies are proceeding and it is anticipated that the S.W.S. Co. will take over the electricity undertaking before the close of the current year.

Rotherham.—FRINGE ORDER.—The Electricity Committee is asking for a Fringe Order to enable it to supply electricity to premises in Wath-upon-Dearne.

Salisbury.—OVERHEAD LINES INQUIRY.—A Ministry of Transport inquiry was held recently into the application of the Salisbury Electric Light & Supply Co., Ltd., to erect overhead lines at Stratford-sub-Castle. Mr. G. A. Crowson, for the company, said that the cost of an overhead scheme would be approximately £1,300, and for an underground scheme £3,100. In view of the financial position the scheme could only be done by overhead lines. There was opposition on behalf of the Salisbury City Council, and the Wilts County Council on the grounds of injury to amenities.

Scarborough.—SUPPLY NEGOTIATIONS.—The Electricity Committee is in negotiation with Viscount Downe with regard to a supply of electricity to his estate at Wykeham and Ruston.

Sleaford.—THE CHANGE-OVER.—The Electricity Committee has obtained sanction to a loan of £9,740 in connection with the change-over of the system of supply.

South Africa.—LICHTENBURG.—The municipal authorities propose to enlist the advice of another engineer on the matter of a new electricity scheme. Mr. Val Davies has previously estimated that a suitable scheme will cost the town about £20,000, but the Council has been unable to raise a loan of this size. It is stated that there are 245 prospective consumers in the town.

The Tennis courts of Messrs. Cadbury Bros. & Co., Ltd., which have been floodlighted by an Ediswan installation

LINKING UP OF POWER STATIONS.—A plan for linking up the Colenso and Congello power stations has been put forward by the Electricity Supply Commission. Besides giving greater capacity of output, it is believed that the scheme would help forward the electrification of the remainder of the railway from Durban to Cato Ridge.

Tamworth.—OFFER TO PURCHASE UNDERTAKING.—The Electricity Committee has reported to the Town Council that it has given further consideration to the offer of the Tamworth District Electric Supply Co., Ltd., to purchase the Corporation's electricity undertaking, and it has decided not to entertain the offer. The matter has been referred to the Council in committee.

Tormorden.—REDUCED CHARGES.—The Electricity Committee has reduced its charges by ½d. per kWh.

Torquay.—ELECTRICITY IN BULK.—At a recent meeting of the Electricity Committee it was decided that no objection should be raised by the Corporation to the proposal of the Teignmouth Electric Lighting Co., Ltd., to afford a supply of electricity in bulk to the Chudleigh Electric Light and Power Co., Ltd.

Uttoxeter.—SUPPLY IN NEIGHBOURING VILLAGES.—The Urban Council has given permission to the Burton Corporation to supply electricity to Draycott-in-the-Clay, Utorchington and Hanbury, on the understanding that the Council may take over the supply at any time on paying the cost of the works less depreciation.

Wallsend-on-Tyne.—H.P. CABLES.—The Town Council has approved plans submitted by the North-Eastern Electric Supply Co., Ltd., for a h.p. transmission cable into Wallsend "G" Pit, and for a h.p. transmission cable from a sub-station in Tyne View Terrace to the Eastern boundary of the borough. Two other plans showing a 6,000 V cable from the High Farm sub-station to the Rising Sun Colliery, and a transmission cable and pilot cable from the Rising Sun colliery winder to Quarry House, Willington Low Row, were disapproved.

Traction

Australia.—SYDNEY TRAMWAYS POSITION.—The deficiency of the Sydney tramways for the current financial year is estimated at £78,909, or £214,231 less than last year. This figure was given when the New South Wales Transport Commissioners applied to the Arbitration Court for a reduction of 10 per cent. in wages. Mr. William Funnell, chairman of the N.S.W. Transport Department, said that the reduction would mean a saving of £89,000. Rationing of work had been found to be uneconomical and would be abolished within six months, and staffs would be reduced to actual requirements.

Blackburn.—AUTUMN ILLUMINATIONS SUCCESS.—The success of the autumn illuminations was shown by a report to the Town Council on October 5th, which stated that in the first ten days nearly 2½ million passengers were carried on trams, etc., the receipts being £18,629.

Brighton.—TRAFFIC MERGER.—It is reported that the draft agreement between the Brighton Corporation and Messrs. Thomas Tilling & Co. for the merging of their transport undertakings has been approved by the Corporation's Legal Committee.

Continental.—SWEDEN.—The Swedish State Railway authorities are about to undertake the electrification of the lines between Stockholm and Ange, a distance of 381 miles, at an estimated outlay of 50 million kronen. Orders for electric locomotives have been given to the A.S.E.A. and to Sieverts Cable Works for cables. It is estimated that the conversion will effect an economy of 80,000 tons of coal per annum.

Irish Free State.—THE DRUMM BATTERY.—It is claimed that the life of the Drumm battery will be 20 years instead of the five years aimed at. According to a statement made this week, some 80 miles can be run by the Drumm battery propelled train—carrying 150 passengers—at a cost of 8s., though what this covers is not clear. When the existing train has completed 50,000 or 60,000 miles a Government report upon its performance will be made. Upon this report will depend, to a great extent, the future of the battery. In the meantime, U.S.A., Canadian, French, German, Italian, and Japanese representatives of railway companies are interested in the running of the train between Dublin and a number of stations.

Leeds.—TRAMWAY EXTENSIONS.—The Transport Committee is to apply for a provisional Order for the construction of a tramway between Cardigan Road and Otley Road.

Portsmouth.—SUCCESS OF ILLUMINATED CAR.—Great success has attended the enterprise of Mr. Ben Hall, engineer and manager of the Portsmouth Tramways Department, in providing the city with the illuminated tramcar shown in our picture. The car, which is brought into service on every festive occasion,

This illuminated tramcar, belonging to the Portsmouth Tramways Department, has played a prominent part in recent festivities in the city

makes a brilliant spectacle, and the wording "Play Up, Pompey," with a picture of the Guildhall along the side of the vehicle is thrown into bold relief. Over 1,600 Siemens lamps were used in the scheme of decoration.

Rotherham.—RAILLESS CARS.—The Corporation Transport Committee is to ask for quotations from Messrs Ransomes for the supply of five chassis, and Messrs Cravens & C. H. Roe, Ltd,. for the supply of bodies for railless vehicles.

Southern Railway.—NEW SIGNALLING SYSTEM.—The three-colour system of power signalling on the London to Brighton line has now been completed. Power signalling on the greater part of the route is already in operation, but the Brighton station and yard will be changed over from mechanical to power signalling on Sunday next. The total cost of the change-over of the entire line is £320,000, of which £120,000 was spent in the conversion at Brighton station. The new signalling is preparatory to the completion by the New Year of the electrification of the line.

Wallsend-on-Tyne.—TRAFFIC SIGNALS.—A sub-committee of the Town Council is to report on the question of installing automatic traffic signals on the Coast Road. It is understood that the scheme has received the sanction of the Northumberland County Council.

Communications

Australia.—EXTENT OF TELEPHONE SERVICE.—Mr. H. P. Brown, Director of Postal Services, states that there are nearly 485,000 telephones in use in Australia. There are 6,061 exchanges, the largest being the City North exchange in Sydney, which serves 7,757 subscribers. This is closely followed by Melbourne Central with 7,699, Malvern 7,691, and City South Sydney 7,625. There are nine exchanges in Australia with over 5,000 connections each. Of the 363,000 subscribers in Australia, 53 per cent. are in the metropolitan area and 47 per cent. in the country. The sixty-eight automatic exchanges now in operation serve 39 per cent. of the subscribers.

Canada.—NATIONAL BROADCASTING.—Two of the three men appointed to the Dominion Radio Broadcasting Commission, charged with the inauguration of nationally controlled broadcasting, are journalists. They are Mr. Hector Charlesworth, managing editor of the *Toronto Saturday Night*, and Mr. Thomas Maher, a French-speaking journalist of Quebec. The other member of the Commission is Lieut.-Col. W. A. Steel, Director of Radio Research, Ottawa. Major Gladstone Murray, of the British Broadcasting Corporation, will be retained temporarily in an advisory capacity.—*Reuter* (Ottawa).

RADIO PRICES DECLINE.—During the three months ended June 30th the average factory price of a receiving set dropped by 35 per cent. to $51 (£10 at par) in comparison with the second quarter of 1931, when the average price was $79 (£16 approx.). The lower price per unit, however, failed to stem the decline in single sales. The sharp drop in unit sales in the second quarter of this year has left a fairly large supply on dealers' and manufacturers' shelves. Old models will have to be marketed in conjunction with the new, says *World-Radio*; some observers see difficulties for those companies which have not kept their stocks at a relatively low level, if distress selling begins. Some of the new developments in the past have been christened with pretentious names and their importance has been exaggerated.

Czecho-Slovakia.—WIRELESS IS ESSENTIAL.—"Wireless has become such a normal necessity of life that it has to be regarded just as essential as electric light." This decision was handed down by a Kosice court after the trial of a case in which a dentist sued a business man for using a radio set which interfered with his wireless reception. The court ordered the offending business man to remove the cause of the trouble within a fortnight.—*Reuter* (Prague).

Great Britain.—RADIO LICENCE CAMPAIGN.—The B.B.C. has received information from the General Post Office that a comprehensive campaign against wireless "pirates" throughout the whole country began on October 10th, and will last for some weeks. No receiving apparatus is exempt, whether it be a radio-gramophone, portable, valve, or crystal set, neither are listeners who are connected with any form of relay service. Extension headphones or loud-speakers connected beyond a listener's household must also have a separate licence.

RADIO EXCHANGES.—Hetton-le-Hole (Co. Durham) Urban Council has agreed to allow the Suburban Radio Relay Co. to use the Council's electric light standards for the carrying of wires on payment of a wayleave rental of 1s. per pole per annum.

Tynemouth Town Improvement Committee has decided to defer consideration of an application until the borough engineer has obtained further particulars.

Longbenton Council has granted Wireless Services, Ltd., permission to start a service.

Neath Rural Council has granted an application by Harrett & Sons to install a relay service at Glyn, Neath.

Wireless Services, Ltd., has applied to the Grays Urban Council for permission to establish a relay service, and the matter has been referred to the Works Committee for consideration.

Guildford Town Council has received several applications, but the Highways Committee has decided not to allow such a service to be established in the town.

Brixham Urban District Council has referred a relay proposal to the General Purposes Committee for consideration.

Irish Free State.—THE ATHLONE STATION.—It is announced that the high-power broadcasting station at Moydrum, Athlone, will be completed in the last week of November or early in December. It will be recalled that this station was first used in a temporary way to broadcast the Pope's message to the Eucharistic Congress, Dublin, after which it closed down while further work was being done. One of the results of the tariffs imposed upon imports since the erection of the station was commenced is that it will cost £15,000 more than was estimated originally.

Spain.—THE TELEGRAPH CONGRESS.—The head of the British delegation to the Congress of the International Telephone, Telegraph, and Radio Communications at Madrid made a vigorous appeal to the Committee which is considering the matter to insist on the abolition of the ten-letter code, pointing out that though the decision in favour of such abolition had been reached by 28 votes to 10, the minority represented a much larger traffic than the majority. The delegates from the United States, Canada and Australia supported the British appeal, and the matter was finally referred to the next meeting of the Assembly.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Arbroath.—October 19th. Town Council. Various works, including electrical, at housing scheme. Specifications, &c. (deposit £1 1s.) from the architects, Messrs. Carver & Symon, 11, Brothock Bridge, Arbroath; tenders to Town Clerk.

Australia.—MELBOURNE.—December 6th. Post and Telegraph Department. Submarine telephone cable. (A. 11511.)*
December 20th. Multiple-twin wire telephone cable. (A.X. 11537.)*

Belgium.—BRUSSELS.—October 27th. Service de l'Electricité d'Ixelles. Supply of 170 d.c. and 400 a.c. electricity meters. Particulars from 20, Rue d'Alsace-Lorraine, Ixelles, Brussels.

Blackburn.—October 24th. Corporation. E.h.p. metal-clad compound filled switchgear. (September 30th.)

Egypt.—CAIRO.—December 3rd. Ministry of the Interior. Electrical distribution network at Tanta. (A.X. 11529.)*
December 10th. Diesel engines, alternators, switchgear, &c. (A. 11530.)*

Fleetwood.—October 29th. Electricity Department. H.p. and l.p. cables. (See this issue.)

Huddersfield.—December 1st. Royal Infirmary. Lamps and electrical sundries. General superintendent and secretary.

India.—NEW DELHI.—October 31st. India Stores Department. A.c. and d.c. house service meters. (A.X. 11517.)*
November 7th. Electric capstans for Vizagapatam Harbour. Director-General India Stores Department, Belvedere Road, S.E.1 (deposit 10s.).
SIMLA.—November 7th. India Stores Department. Electric bulbs for signalling lamps and torches. Director-General, India Stores Department, Belvedere Road, S.E.1 (deposit 5s.).
November 14th. Inert cells and dry batteries. Director-General (deposit 5s.).

London.—FULHAM.—October 29th. Electricity Department. Condensing plant, &c. (September 30th.)
SOUTHWARK.—October 26th. Electricity Department. Cable. (See this issue.)

Oban.—October 28th. Electricity Department. Rotary or motor convertor. (October 7th.)

Plymouth.—October 17th. City Council. Automatic traffic signals. (October 7th.)

Singapore.—October 20th. Municipal Council. Electrically driven pumps. (G.X. 11874.)*

Sleaford.—October 15th. Electricity Department. House service meters. (October 7th.)

South Africa.—JOHANNESBURG.—October 20th. City Council. Automatic traffic signals. (A.X. 11510.)*
November 11th. South African Iron & Steel Industrial Corporation, Ltd. Fuel-handling plant for Pretoria steelworks power station. (A.X. 11513.)*
DURBAN.—October 28th. City Council. 6,600-V metal-clad switchgear. (A.X. 11500.)*
November 4th. Pilot and telephone cable. (A. 11514.)*
CAPETOWN.—November 16th. Electricity Department. Transformers. (A. 11512.)*
November 9th. H.P., l.p. and telephone cables. (A.X. 11521.)*
GRAHAMSTOWN.—November 8th. Corporation. Transformers and other equipment (A.X 11524)* and turbo-alternators and accessories (A.X. 11525.)*

Straits Settlements.—SINGAPORE.—November 15th. Municipal Council. Sewage pumps, electrical equipment, &c. (G.X. 11920.)*

Stranraer.—October 24th. Town Council. Electrical fittings, for housing scheme. Plans and specifications from Mr. A. Maclean Goudie, architect, 30, Lochryan Street (deposit £1); tenders to Town Clerk.

Uruguay.—MONTEVIDEO.—November 1st. 500,000 metres of Hackethal type insulated wire, comprising equal quantities of 16 and 20 mm. wire. (A.X. 11509.)*

Wick.—October 22nd. Town Council. Electric lighting for housing scheme. Burgh surveyor, Wick (deposit £1 1s.).

*Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Accrington.—Education Committee. Accepted. Electrical installation at the Grammar School.—G. V. Stephenson & Sons.
Electricity Committee. Recommended. Converting old traction battery to emergency lighting battery (£178).—Chloride Electrical Storage Co., Ltd.

Barrow-in-Furness.—Electricity Committee. Accepted. Electrical fittings for Walney Bridge (£176), suspension fittings for Abbey Street (£306).—Revo Electric Co., Ltd. Voltage regulator (£68).—Ferranti, Ltd. Three switches (£100).—Ferguson, Pailin, Ltd. Protective gear (£805).—Metropolitan Vickers Electrical Co., Ltd.

Bolton.—Watch Committee. Accepted. Automatic traffic signals.—Automatic Electric Co., Ltd.; Forest City Electric Co., Ltd.
Finance Committee. Accepted. Electrical installations at the new civic buildings.—Engineering Service Co.

Bury.—Education Committee. Accepted. Installation of electric lighting at Fishpool new schools.—Law & Carruthers.

Dumfries.—Corporation Housing Committee. Accepted. Electrical work at ninety-six houses at Sandside.—Gordon & Moodycliffe.

Hull.—Telephones Committee. Recommended. Cable (£163).—Power & Lighting Cables, Ltd.

Ilford and Barking.—Joint Sewerage Committee. Recommended. Electrically driven drainage pump (£360).—Tangyes, Ltd.

Ilford.—Highways Committee. Recommended. Traffic signals (£113).—Revo Electric Co., Ltd.

Keighley.—Electricity Committee. Accepted. E.h.p. overhead transmission line from Haworth to Oxenhope (£640).—Craven & District Electrical Construction Co., Ltd.

Kettering.—Electricity Committee. Recommended. Renewal of battery plates (£398).—Tungstone Accumulator Co.

Lichfield.—Rural District Council. Accepted. Installation of electric lighting in houses at Brereton and Handsacre (£157).—J. W. Richards.

Liverpool.—Port Sanitary and Hospitals Committee. Recommended. Radio installation for sanatorium (£83).—Edison Swan Electric Co., Ltd. Radio installation at Olive Mound Children's Hospital (£98).—Lotus Radio, Ltd.
Corporation Tramways Committee. Accepted. Tramway special trackwork.—Hadfields, Ltd. (£210); Edgar Allen & Co., Ltd. (£296).

London.—ST. MARYLEBONE.—Electricity Supply Committee. Recommended. Transformers.—English Electric Co., Ltd.; British Electric Transformer Co., Ltd. Switchgear for the year ending October 13th, 1933.—Ferguson, Pailin, Ltd.; Metropolitan-Vickers Electrical Co., Ltd.

Meltham.—Urban District Council. Accepted. Installation of electric lighting in 91 houses.—F. Platt.

Portsmouth.—Electricity Committee. Accepted. Cable (£280).—Johnson & Phillips, Ltd.

Rawmarsh.—Urban District Council. Accepted. Installation of electric lighting at the isolation hospital (£172).—Dean's Electrical & Engineering Co., Ltd.

Scarborough.—Electricity Committee. Accepted. 200-kW rotary convertor (£525).—Brush Electrical Engineering Co., Ltd.

Spenborough.—Urban District Council. Accepted. Installation of electric lighting at 100 houses.—Hepworth & England.

Swindon.—Electricity Committee. Accepted. Switchboard (£136).—English Electric Co., Ltd.

Tynemouth.—Town Council. Accepted. Cable for the ensuing twelve months (£228).—Macintosh Cable Co., Ltd.

Worthing.—Municipal Buildings Committee. Accepted. Electric lighting fittings (£1,723).—Grierson, Ltd.
Electricity Committee. Accepted. 300-kVA transformer (£161).—Crompton Parkinson, Ltd.

Forthcoming Events

British Electrical Development Association.—Friday, October 14th. Caxton Hall, S.W. 7.30 p.m. "Hotel Lighting and the Hotel Lighting Campaign." Messrs. W. J. Jones and V. W. Dale.

Birmingham Electric Club.—Friday, October 14th. Grand Hotel, Birmingham. 7 p.m. Ladies' night.

Electrical Power Engineers' Association (Manchester Section).—Saturday, October 15th. Grand Hotel, Manchester. 5.30 for 6 p.m. Annual dinner and dance.

Association of Supervising Engineers.—Tuesday, October 18th. Junior Institution of Engineers, London. 7.15 p.m. Presidential address. Mr. G. Scott Ram.

Illuminating Engineering Society.—Tuesday, October 18th. Visit to Shakespeare Memorial Theatre, Stratford-on-Avon.

Institute of Fuel.—Wednesday, October 19th. Connaught Rooms, Gt. Queen Street, W.C. 6.45 for 7.15 p.m. Annual dinner and dance.

Institution of Welding Engineers.—Wednesday, October 19th. Institution of Mechanical Engineers, London, S.W. 7.45 p.m. "The Radiographic Examination of Welds." Mr. R. A. Stephen.

Edinburgh Electrical Society.—Wednesday, October 19th. Philosophical Institution, Edinburgh. 8 p.m. "Some Modern Developments in Electrical Science." Mr. R. W. J. Stark.

Institution of Electrical Engineers.—Thursday, October 20th. Institution, London. 6 p.m. Presidential address. Prof. E. W. Marchant. (*Mersey and North Wales (Liverpool) Centre.*)—Monday, October 17th. University, Liverpool. 7 p.m. Chairman's address. "Some Aspects of the Electrical Industry in Relation to Great Britain's Economic Position." Mr. A. C. Livesey. (*Western Centre.*)—Monday, October 17th. Guildhall, Gloucester. 6 p.m. Chairman's address. Mr. F. H. Corson. (*Scottish Centre.*)—Tuesday, October 18th. 39, Elmbank Crescent, Glasgow. 7.30 p.m. Chairman's address. Mr. D. H. Bishop. (*North-Western Centre.*)—Tuesday, October 18th. Midland Hotel, Manchester. 7.30 p.m. Chairman's address. Mr. G. F. Sills. (*North-West Midland Students' Section.*)—Tuesday, October 18th. Hotel Metropole, Leeds. 7.30 p.m. Chairman's address. Mr. R. O. Yardley. (*South Midland Centre.*)—Wednesday, October 19th. Grand Hotel, Birmingham. 7 p.m. Chairman's address. Mr. J. Morton. (*South Midland Students' Section.*)—Tuesday, October 18th. Midland Hotel, Birmingham. 7 p.m. Inaugural address. Mr. G. H. Halton.

Electrical Association for Women.—Thursday, October 20th. 1.30 p.m. Visit to Broadcasting House, Portland Place, W.

Faraday House Old Students' Association.—Friday, October 21st. Savoy Hotel, W.C. 6.30 for 7 p.m. Annual dinner.

Institution of Production Engineers.—Friday, October 21st. Holborn Restaurant, W.C. 6.30 p.m. Annual general meeting. 7 for 7.30 p.m. Annual dinner.

Notes

Birmingham Power Engineers' Dinner

The annual dinner and dance of the Birmingham and District Section of the Electrical Power Engineers' Association took place on October 6th at the Billesley Arms Hotel, King's Heath, and was well attended. Mr. H. J. Cox (chairman of the section) presided, and among those present were the Deputy-Mayor of Birmingham (Ald. W. W. Saunders), Mr. H. J. Taylor (president of the E.P.E.A.), Mr. S. T. Allen (Central Electricity Board), Mr. C. M. Shaw (city electrical engineer, Worcester), Mr. F. Forrest (city electrical engineer, Birmingham), Mr. W. J. Marston (city electrical engineer, Coventry), Mr. J. Morton (chairman, South Midland Centre), Mr. W. A. Jones (general secretary of the Association), and Mr. H. Hooper (honorary secretary, South Midlands Centre, I.E.E.).

The toast of "The Association" was proposed by Mr. C. M. Shaow, who referred to the high traditions which had been set in the work of the Association. In the early days it had a hard fight but it had gone ahead, and to-day its position was such as to give them genuine cause for pride. He regarded the outlook in the industry as satisfactory. The toast was acknowledged by Mr. H. J. Taylor, who said that the Association had raised the electrical power engineer almost from obscurity to a professional status, and by participation in the work of the National Joint Board had given the members conditions of service which were second to none in the engineering industry. The operation of the Central Electricity Board scheme would inevitably cause some hardship and displacements, and committees had been set up to deal with this matter. Certain positions would become redundant, but he could assure them that the Association was doing everything in its power to lessen hardship and to prevent the industry from losing the valuable services of those who might be displaced.

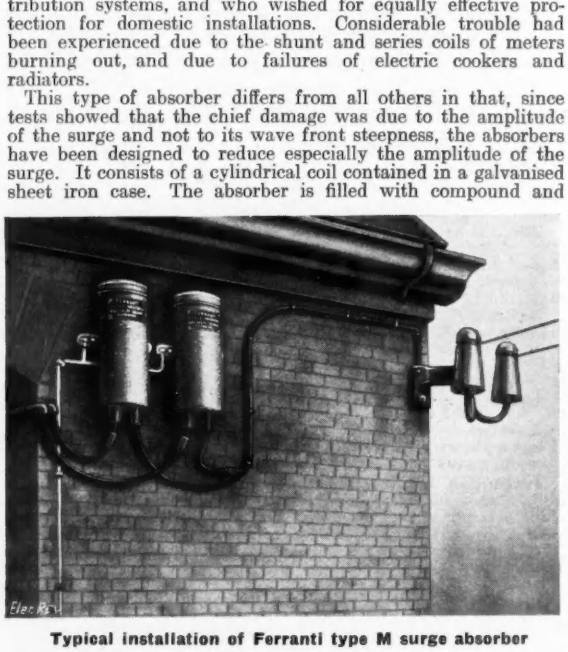
The toast of the "Visitors" was proposed by the chairman, and Alderman Saunders replied.

Lightning and Low-voltage Networks

At a recent meeting of the Overhead Lines Association, reported in the ELECTRICAL REVIEW of September 30th, several speakers described instances of damage to low-voltage networks due to lightning surges, and inquired if there were available any cheap and effective protective device.

Mr. E. T. Norris, chief designer, Ferranti, Ltd., informs us that "Type M" house service surge absorber fulfils this requirement. It was originally produced in response to a demand from customers in the tropics who had had experience of the Ferranti surge absorber for transmission and distribution systems, and who wished for equally effective protection for domestic installations. Considerable trouble had been experienced due to the shunt and series coils of meters burning out, and due to failures of electric cookers and radiators.

This type of absorber differs from all others in that, since tests showed that the chief damage was due to the amplitude of the surge and not to its wave front steepness, the absorbers have been designed to reduce especially the amplitude of the surge. It consists of a cylindrical coil contained in a galvanised sheet iron case. The absorber is filled with compound and



Typical installation of Ferranti type M surge absorber

hermetically sealed up, the leads coming through porcelain bushes at the bottom of the absorber in the form of cambric insulated weatherproof cables. The absorbers are suitable for line pressures up to 600 V and for currents up to 50 A; the price ranges from 10s. 6d. upwards. Tests show that these absorbers reduce the amplitude of an incoming surge to approximately 10 to 15 per cent. of the original value.

These appliances have been very successful in operation, and there are now many hundreds of installations in this and other countries.

Old Finsbury Students

The Finsbury Technical College Old Students' Association is proposing to hold a series of informal and inexpensive dinners during the next six months to enable old students to "get together." Those interested should write to the hon. secretary, Mr. F. R. C. Rouse (Venner Time Switches, Ltd.), New Malden, Surrey, or 15, Clifton Gardens, Golders Green, N.W.11.

The Generation of Electricity in September

The Official Returns rendered to the Electricity Commissioners show that 922 million kWh was generated by authorised undertakers in Great Britain during September as compared with the revised figure of 875 million kWh in the corresponding month of 1931, or an increase of 5.4 per cent.

During the first nine months of 1932 up to the end of September the total amount of electricity generated by authorised undertakers was 8,632 million kWh, as compared with the revised figure of 8,058 million kWh for the corresponding period of 1931, representing an increase of 574 million kWh or 7.1 per cent.

Electric Shocks at a Fire

During a fire which occurred at Ealing on Sunday last, three firemen received electric shocks through coming into contact with "live" wires. None of them was seriously injured.

Appointments Vacant

Telephone engineer and manager for the Barbados Telephone Co.

Assistant distribution engineer for the China Light & Power Co. (1918), Ltd.

Sales and installation engineer for Newport Electricity Department.

The George Montefiore Foundation

A prize of about 21,500 fr. derived from a legacy of George Montefiore is awarded every three years for the best paper (for any nation) contributing to the scientific and technical advance of electricity. For the 1929-32 period nineteen theses were submitted and the jury at a meeting at Liège on October 2nd decided to divide the prize among Professor L. Barbillion (of Grenoble), Dr. A. Guilbert, and Mr. C. J. van Griethuyen.

The Textile Machinery Exhibition

The Textile Machinery and Accessories Exhibition was opened on Friday last by the Lord Mayor of Leicester, Alderman W. E. Wilford, J.P.; it remains open until to-morrow (Saturday). All the machines in the exhibition, representing a very comprehensive display of everything required for the hosiery and allied trades, are shown working and are driven entirely by electricity. The equipment of the exhibition has been largely in the hands of the Midland Dynamo Co., Ltd., and J. A. Somerset & Co.

A sewing machine drive which is fitted under the bench and a system of group driving for hose and half hose machines are shown by the former firm, while Messrs. Somerset & Co. make a special feature of a hinged motor for floor fixing with vertical drives and for wall fixing with horizontal drives. Among hydro-extractors, which are now almost universally electrically driven, are examples by Manlove Alliott & Co., Ltd., Hill & Herbert, Ltd., and Thomas Broadbent & Sons, Ltd. The last-mentioned concern has brought out a new self-balancing model.

As usual there are a number of winding machines for the electrical industry. The "Leesona" No. 104 winder makes twelve identical coils, complete with paper insulation automatically inserted and cut off. The No. 84 is now available for winding four "cross-wound" coils at a time instead of a single coil. The same firm is showing a warping creel incorporating the "Carver" patent warp stop motion. In addition to the electric stop motion a small electric light bulb indicates the position of the broken thread. Crowther, Ltd., agents for "Pourtier" wire insulating machines have, in conjunction with Harling & Todd, Ltd., recently formed a subsidiary company, the English Insulated Machines, Ltd., which is now producing machines by the "Pourtier" patents in this country. At the exhibition these machines are seen covering fine wires and strips of paper at a speed of 3,000 r.p.m.

Cook & Co. (Manchester), Ltd., are showing a new cable covering machine. The Sturtevant Engineering Co. exhibits a portable dust-blower for cleaning electric motors, &c. Other exhibiting firms include W. & T. Avery, Ltd., Grant & West, Ltd., the International Time Recording Co., Ltd., Renold and Coventry Chain Co., Ltd., and Thomas & Bishop, Ltd.

The Batti-Wallahs

The first luncheon of the Batti-Wallahs' Society for the session will be held at the Hotel Metropole on Tuesday, November 1st, at 1 o'clock. An address will be delivered by Mr. J. S. Highfield.

Our Service Department

Inquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the names and addresses of the makers of the following:—

OVERCHECK high-power cell.

WEVOMETER voltmeter.

"IDJOEX" material for protecting lead sheathing against boring insects.

Fuseable plugs used in connection with electric wash boilers.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

Mr. P. M. Edinborough resigned his position as manager of the Domestic Appliance Department of the Edison Swan Electric Co., Ltd., to take up an appointment as commercial manager at the "Xcel" appliance factory of the Automatic Electric Co., Ltd., Liverpool, as from October 1st. Mr. Edinborough's first acquaintance with the electric domestic appliance industry commenced 21 years ago, when he joined the staff of the British Promethus Co., Birmingham. Later he joined the Electric and Ordnance Accessories Co., Ltd., Birmingham, at that time a subsidiary of Vickers, Ltd., and manufacturers of the "Eclipse" range of cookers and appliances. He served in France during the War and in 1920, when the Metropolitan-Vickers Electrical Co., Ltd., took over the appliance business of Electric and Ordnance Accessories, he took charge of the production of "Cosmos" appliances in the capacity of manager of their appliance factory at Brimsdown, Middlesex. During this period several of his patents relating to appliance designs were successfully applied. Soon after the formation of Metro-Vick Supplies, Ltd., he was appointed sales manager of the domestic appliance department of that company. In 1930, shortly after the formation of the Associated Electrical Industries, Ltd., the domestic appliance departments of the Metro-Vick Supplies, Ltd., B.T.-H. Co., and the Edison Swan Electric Co., Ltd., were amalgamated and the appliance business of the three concerns was taken over by the latter company, which appointed Mr. Edinborough manager of the newly merged Domestic Appliance Department of the A.E.I. group. On September 23rd Mr. Edinborough was entertained by members of his departmental staff and old colleagues and a presentation was made to him.

Mr. P. M. Edinborough, who has joined the Automatic Electric Co.

Mr. L. A. Paish, O.B.E., H.M. Trade Commissioner in New Zealand, is now in this country on an official visit. He will be available at the offices of the Department of Overseas Trade during the period October 17th to 20th for the purpose of interviewing manufacturers and merchants interested in the export of goods to New Zealand. At a later date Mr. Paish will visit a number of industrial centres in the provinces. Firms desiring interviews should communicate with the Comptroller-General of the D.O.T., 35, Old Queen Street, S.W. (Reference 13592/32).

At the annual meeting of the Leeds Electrical Club on September 30th the following officers were elected :—President : Mr. C. Nelson Hefford ; vice-presidents : Messrs. J. G. Craven, C. J. Wilson, D. Green, and H. Hobson ; hon. secretary, Mr. E. G. Sellers ; hon. assistant secretary, Mr. S. T. Needham ; hon. treasurer, Mr. E. J. Dunn.

Mr. Guy Locock, C.M.G., has been appointed director of the Federation of British Industries by the Grand Council. Mr. Locock began his career in the Foreign Office, where he filled the office of private secretary to various ministers. In 1918 he was attached to the Department of Overseas Trade as private secretary to the Minister, on the formation of that department. Since joining the Federation of British Industries as assistant director in 1919, Mr. Locock has applied his activities to every side of industrial development, particularly in respect of our foreign and imperial trade. He has carried out various missions on behalf of the Federation, in the course of which he has travelled extensively in the North and South American Continents, and in Europe and the Near East. He was a member of the British delegation to the Diplomatic Conference on International Exhibitions, held in Paris in 1928 ; representative of the International Chamber of Commerce on the Statistical Conference of the League of Nations ; vice-president of the Exhibitions Committee of the International Chamber of Commerce ; member of the Government Committees on the British Industries Fair, and a member of the British Committee on Empire Trade. He has been acting director of the Federation since the resignation of Sir Roland Nugent in May last.

[Elliot & Fry

Mr. Guy Locock, the director of the F.B.I.

In our last issue we incorrectly reported that **Miss Hainsworth** was leaving Aylesbury to take up an appointment at Bradford. Miss Hainsworth is joining the Bedford Corporation Electricity Department.

Dr. R. S. Wallace, a member of the Australian Broadcasting Commission, is on his way to this country. He is making a world tour inspecting university systems, and has also undertaken to investigate radio broadcasting developments on behalf of the Australian authorities.

Mr. W. M. Bishop has been appointed by the Portsmouth Corporation Electricity Committee as assistant consumers' engineer.

Mr. F. W. Leevers

Mr. F. W. Leevers, whose photograph accompanies these notes, has been appointed manager of the heating and domestic appliance business of the Edison Swan Electric Co., Ltd. He gained his early electrical engineering experience with Messrs. Ferranti, Ltd., and the British Westinghouse Co., Ltd., and was for some years technical advisor in the Far East to the Yansi Shoten engineering organisations of Tokyo, Japan. He joined the British Thomson - Houston Co., Ltd., just before the War, and was chiefly concerned with executive work and the company's merchandising business. Mr. Leevers has been responsible for the production in this country of many designs hitherto made abroad. He has served at various times on E.D.A. committees as well as manufacturers' and other associations, was one of the committee entrusted with the drafting of the present-day I.E.E. Foreign Conditions of Contract, and he is still a member of the "Fair Trading" Committee.

Mr. J. F. Anderson, who has been elected president of the Electrical Contractors' Association of Scotland, is a member of the firm of John F. Anderson, electrical, heating and sanitary engineers, with whom he commenced his electrical training over thirty years ago. During the War he was in the Royal Flying Corps and was for a time on the technical staff at the London Polytechnic and Liverpool University. He has been vice-chairman and chairman of the Aberdeen branch of the Electrical Contractors' Association of Scotland and joined the Central Board of the Association in 1927. During last year he was vice-president of the Association.

[Hardie

Mr. J. F. Anderson, president of the E.C.A. of Scotland

Mr. A. Lennox Stanton, president of the Overhead Lines Association, asks us to mention that he is a member of the American Society of Mechanical Engineers, not of the American Institute of Electrical Engineers, as inaccurately stated on p. 519 of our last issue.

Mr. Samuel Insull, who went from Paris to Milan last week, travelled later to Athens. He was under police detention there for a time, but was set at liberty on Tuesday evening as the Public Prosecutor stated that there were no legal grounds for his arrest. Press reports record Mr. Insull as stating that he had committed no crime and the failure of his companies was not fraudulent. **Mr. Martin Insull** is stated to be contesting the proceedings for his extradition from Canada.

Messrs. O. H. Baldwin and **A. G. Freeborn** have been elected members of the Batti-Wallahs' Society.

Mr. E. Lunn, deputy electrical engineer to the Huddersfield Corporation, who was recently knocked down by a motor car and sustained scalp wounds, facial injuries and cuts to the hands, which necessitated his detention in the Royal Infirmary, is reported to be progressing satisfactorily.

Following the retirement of **Mr. T. Stirk**, traffic superintendent, the Bradford Tramways Committee has recommended the appointment of **Mr. F. Evans**, assistant traffic superintendent, to succeed him, at a salary of £302 rising to £350. **Mr. H. Benn**, assistant in the Traffic Department, is recommended as Mr. Evans's successor at a salary of £271 advancing by increments to £325.

Mr. J. S. Tritle, of the Westinghouse Electric & Manufacturing Co., was elected president of the American National Electrical Manufacturers' Association at the annual meeting held recently in New York.

Mr. J. G. Charlton has resigned his position as electrical and lampshade buyer with Messrs. Harrods, Knightsbridge, W., and communications should be addressed to him at 46, Craigen Avenue, Addiscombe, Surrey.

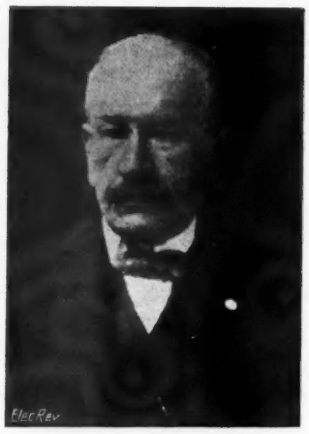
Brig.-Gen. W. H. Hayes has been appointed a director of Edmundson's Electricity Corporation, Ltd., and he has also joined the board of the Shropshire, Worcestershire & Staffordshire Electric Power Co.

Obituary

Mrs. Price-White.—We regret to learn of the death of Mrs. Price-White, wife of the borough electrical engineer of Bangor, which occurred on September 28th at Bangor, North Wales. Mrs. Price-White was very active in public affairs, and was a member of the Caernarvon County Council. She was associated with the Electrical Association for Women, and was formerly chairman of the executive committee of the North Wales Branch, and latterly the president. Some years ago she read a paper on "Electricity in the Home" at the Conference of the National Council of Women, and has spoken frequently at electrical conferences in North Wales. She was regarded as an authority on electrical matters by the local Education Committee, and it was at her suggestion that the first system of tubular heating was installed in the Caernarvonshire schools. The funeral took place on October 1st.

Mr. F. Thompson.—The death is announced, after a brief illness, of Mr. Fredk. Thompson, works superintendent to the English Electric Co., Ltd., at Stafford, where he had been employed for the past nine years. He was 49 years of age.

Dr. C. O. Mailloux,—The death is reported of Dr. C. O. Mailloux, former president and honorary president of the International Electrotechnical Commission, which occurred suddenly in New York on October 4th. Dr. Mailloux was one of the founders of the I.E.C., and until his death he never ceased to take an active part in its work, particularly as regards the preparation of the I.E.C. International Vocabulary. In 1921 he assisted in the creation of the Conférence Internationale des Grands Réseaux Electriques à Haute Tension, the headquarters of which are in Paris, and he was elected an honorary president of this body. He was president of the American Institute of Electrical Engineers in 1913-1914. Dr. Mailloux was well known in England as well as in most European countries to which his work as a consulting engineer often took him.



The late Dr. C. O. Mailloux

Mr. C. Makinson, central workshops manager for the Bradford Dyers' Association, Ltd., who died last week, was superintendent in the Wallasey Corporation Electricity Department from 1912 to 1918, when he joined the engineering staff of the B.D.A. Mr. Makinson was 53 years of age and leaves a widow and two sons.

Mr. A. J. Davis.—The death is announced at the age of 28 years of Mr. Arthur James Davis, who was an electrical engineer at the Dover Corporation electricity works.

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

Luxram Lamp Works, Ltd.—Private company. Registered October 3rd. Capital, £5,000 in £1 shares. Objects: To carry on the business of manufacturers of electric lamps, glassware and fittings, accessories and sundries for domestic, commercial, and wireless purposes, &c. The first director is J. Waimann, 271, High Road, N.W.6. Secretary: D. F. Gay. Registered office: No. 1 Building, Angel Road Factory Colony, Upper Edmonton, N.18.

Sonochorde Reproducers, Ltd.—Private company. Registered October 5th. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in wireless or radio sets, &c. The subscribers (each with one share) are: W. Rawlings, 127, Fleetwood Road, Dollis Hill, N.W.10; B. W. Wallace, "Mia Casa," Powys Lane, Palmers Green, N.13. R. A. Rothermel, 23, Orchard Court, Portman Square, W.1 (director of Rothermel Corporation, Ltd.), is permanent governing director. Registered office: Rothermel House, 1, Willesden Lane, N.W.6.

Kniveton Cable Works, Ltd.—Private company. Registered October 5th. Capital, £5,000 in £1 shares (2,000 ordinary and 3,000 7 per cent. non-cumulative participating preference). Objects: To acquire the business of the Kniveton Cable Works, carried on by F. Kniveton, at 6, Queensway, Ponders End, and to carry on the business of manufacturers of and dealers in electrical, wireless and automobile accessories, wires, cables, components, &c. The directors are: F. Kniveton, 7B, London Road, Enfield (life director); G. W. Templar, 79, Gunterstone Road, W.14. Registered office: Suite 14, 128, Shaftesbury Avenue, W.1.

Alger's Wholesale Supplies, Ltd.—Private company. Registered October 6th. Capital, £100 in £1 shares. Objects: To carry on the business of wholesale dealers in electrical apparatus, equipment, accessories and supplies, wireless receivers and transmitters, &c. The subscribers (each with one share) are: F. J. Alger, 29, Llanthewy Road, Newport, Mon; T. E. Alger, A.M.I.E.E., 50, Oakfield Road, Newport, Mon. Secretary: F. J. Alger. Registered office: 160, Dock Street, Newport, Mon.

Faversham Relay Service, Ltd.—Private company. Registered October 6th. Capital, £4,000 in 3,000 preference shares of £1 and 20,000 ordinary shares of 1s. each. Objects: To construct, establish and maintain stations for the reception or distribution of radio signals, &c. The directors are: J. E. Ball, 1, First Avenue Parade, Clacton-on-Sea; J. W. Field, "Brooklyn," Canterbury Road, Herne Bay. Registered office: 55, Preston Street, Faversham.

Bristol's Instrument Co., Ltd.—Private company. Registered October 3rd. Capital, £10,000 in £1 shares. Objects: To adopt agreements (1) between the Bristol Company, U.S.A., of the first part, this company of the second part, and J. W. & C. J. Phillips, Ltd., of the third part, and (2) with J. W. & C. J. Phillips, and to carry on the business of manufacturers, assemblers and repairers of and dealers in industrial or scientific instruments, apparatus, &c., carried on by J. W. & C. J. Phillips, Ltd., at 144, Pomeroy Street, S.E., and that of electrical engineers, electricians, manufacturers of electrical machinery, &c. The directors are: H. H. Bristol (chairman for life), S. R. Bristol, and C. W. Bristol; A. L. Dugon (vice-chairman and sole managing director for life), 144, Pomeroy Street, S.E.14, engineer; Mrs. E. F. Dugon, "Soucy," Footscray Lane, Sidcup, Kent; and L. B. Lambert, address not stated. Secretary: C. Haylock. Registered office: 144, Pomeroy Street, S.E.14.

P. Whetton (Astoria), Ltd.—Private company. Registered October 8th. Capital, £200 in £1 shares. Objects: To acquire the business of a manufacturer and distributor of wireless apparatus in accordance with an agreement made between E. P. Whetton of the one part and the company of the other part. The subscribers (each with one share) are: E. P. Whetton, 67, Albion Road, Stoke Newington, N.16; A. Parker, 23, Springwell Road, Heston, Middlesex. Secretary (*pro tem.*): E. P. Whetton. Solicitor: F. P. Woodcock, 5, Holborn, E.C.1.

Charles Radio Relay Co., Ltd.—Private company. Registered October 4th. Capital £3,000 in £1 shares. Objects: To acquire, construct, maintain or deal with wireless and electrical radio apparatus, and to carry on the business of wireless engineers, &c. The directors are: J. C. Charles, 15, Castle Street, Tredegar; C. D. Watkins, 19a, Castle Street, Tredegar. Registered office: 15, Castle Street, Tredegar, Mon.

Returns of Electrical Companies

Polchar's Wireless, Ltd.—Particulars filed of debentures for not more than £5,000, authorised July 1st, 1932, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £776.

Electrolumination (Abadie Process), Ltd.—First mortgage debenture dated September 28th, 1932, to secure £2,500, charged on the company's undertaking and property, present and future, including uncalled and unpaid capital. Holders: Westminster Bank, Ltd.

Slough Radio Co., Ltd.—Memorandum of deposit dated September 19th, 1932, to secure all sums paid or for which guarantors may be liable under guarantees given to the Midland Bank, Ltd. Property charged: Lease of 3, 4 & 5, Oakley Square, Slough. Holders: Exors. of I. Day and Mrs. E. Day.

Yorkshire (West Riding) Electric Tramways Co., Ltd.—Trust deed dated September 15th, 1932 (supplemental to trust deed dated June 6th, 1905, securing £275,000, of which £256,168 is outstanding), charged on 80,000 £1 shares in West Riding Automobile Company, Ltd., as additional security. Trustees: London and Colonial Investment Corporation, Ltd., 5, Whittington Avenue, E.C.

Howarth Green & Co., Ltd.—Satisfaction to the extent of £2,000 on March 31st, 1932, of debentures authorised March

25th, 1927, and registered April 6th, 1927. (Notice filed September 30th, 1932.)

Peto Scott Co., Ltd.—Satisfaction to the extent of £1,600 on July 2nd, 1932, of debentures authorised July 28th, 1930, and registered July 31st, 1930. (According to the register of mortgages the debentures registered July 31st, 1930, originally secured £4,000.)

Edison Swan Cables, Ltd.—Capital, £150,000 in 100,000 preference shares of £1 each and 200,000 ordinary shares of 5s. each. Return dated May 3rd, 1932. 900 preference and 200,000 ordinary shares taken up. £50,900 paid. Mortgages and charges: £237,450.

Bennett & Fountain, Ltd.—Capital, £300 in £1 shares. Return dated January 28th, 1932 (filed May 10th, 1932). 2,000 shares taken up. £1,000 paid. £1,000 considered as paid. Mortgages and charges: None registered.

Pritchett & Gold & E.P.S. Company, Ltd.—Capital, £200,000 in 100,000 preference and 100,000 ordinary shares of £1 each. Return dated May 26th, 1932. All shares taken up. £30,394 paid on 15,233 preference and 15,161 ordinary shares. £169,606 considered as paid on 84,767 preference and 84,839 ordinary shares. Mortgages and charges, nil.

Wandsworth Electrical Mfg. Co., Ltd.—Capital, £25,000 in £1 shares. Return dated April 26th, 1932. 17,230 shares taken up. £14,365 paid. £2,865 considered as paid. Mortgages and charges, nil.

West Cornwall Electricity Supply Co., Ltd.—Capital, £100,000 in £1 shares. Return dated May 5th, 1932. All shares taken up. £37,504 7s. 6d. paid (being £1 per share on 7 and 7s. 6d. per share on 99,993 shares). Mortgages and charges, nil.

Brush Electrical Engineering Co., Ltd.—Return dated June 20th, 1932. Capital, £600,000 in 476,401 shares of £1 and 29,663,760 shares of 1d. each. 476,401 £1 shares and 2,910,190 1d. shares issued. £327,348 0s. 10d. paid in cash on 315,226 £1 shares and 2,910,190 1d. shares. £161,175 considered as paid on 161,175 £1 shares. Mortgages and charges, £172,507.

British Battery Co., Ltd.—Two notices of the appointment of E. V. Amsdon, of 22, Walbrook, E.C., as receiver and manager on October 5th, 1932, under powers contained in debentures. dated August 21st, 1931, and November 29th, 1929.

Normand Electrical Co., Ltd.—Satisfaction to the extent of £1,200 (being full amount issued), on June 30th, 1932, of debentures dated March 5th, 1926, and registered March 16th, 1926, securing £2,000. (Notice filed October 5th, 1932.)

Consolidated Radio Co., Ltd.—Issue of September 24th, 1932, of £2,000 debentures, part of a series already registered.

City Notes

Grosvenor Electric Batteries, Ltd., reports net profits for the year ended June 30th last of £12,106, as compared with £5,995 for the first accounting period of twenty-one months, to which is added £1,897 brought in, making £14,003. After appropriating £7,000 for bonus shares allotted in March last, it is proposed to pay a final ordinary dividend of 5 per cent., making 10 per cent. for the year, leaving £1,825 to be carried forward. The original 15,000 cumulative redeemable preference shares of £1 each were converted into ordinary shares and a further 23,846 ordinary shares of £1 each were issued at par for cash. Out of the proceeds extensions are being made to the existing plant and machinery at the factory at Watford. As, however, these shares were not issued until towards the end of the financial year, the benefits of the extensions are not reflected in the current accounts. Meeting: To-day (Friday).

The Fife Tramway Light & Power Co., Ltd., has circularised holders informing them that the directors have had under consideration the advisability of making a return to the shareholders out of the cash resources of the company of a portion of the issued share capital, and they are of opinion that this can now be arranged without in any way prejudicing the business. The effect of three resolutions which the shareholders will be asked to pass at a forthcoming meeting is to provide for the return to the shareholders of 5s. per share by reducing the issued share capital by £125,000. For each existing ordinary share of £1 the holder will receive (a) 5s. cash, and (b) three ordinary shares of 5s. each, fully paid. The third resolution provides for the increase of the share capital by £125,000 simultaneously with the above reduction.

Post Office "detectives" on the track of wireless "pirates"

The British Columbia Power Corporation, Ltd., reports a gross revenue for the year ended June 30th of $14,356,841, as compared with $15,119,945 in the preceding year. It is stated that depression in business has affected the revenues of all departments, but more particularly the revenue from transportation services, which shows a decrease of 10.8 per cent. Expenses, taxes, depreciation, and renewals required $9,837,003, leaving a net revenue of $4,519,838 ($5,022,558). Bond interest, &c., and payment of dividends on class "A" shares absorbed $2,000,000, leaving a surplus of $9,339, as against $436,816. The demand for industrial power declined, and the total sales fell from 372,282,045 kWh to 346,549,095 kWh, in spite of an increase in the number of consumers and the total connected load.

The United River Plate Telephone Co., Ltd., reports a profit for 1931 of £737,387, as compared with £531,857 in the preceding year. The final ordinary dividend is 5 per cent., making 8 per cent. for the year (same), and £225,950 is carried forward (against £127,689 brought in).

The British Electric Transformer Co., Ltd., has presented a petition to the High Court for the confirmation of the reduction of its capital from £1,000,000 to £565,625. The petition will be heard in London on October 17th.

The Société Internationale d'Energie Hydro-Electrique ("Sidro") reports a profit, including 218,459 fr. brought in, of 12,292,577 fr., to which is added 2,725,000 fr. transferred from reserve, making 15,017,577 fr.

The Electrical Finance & Securities Co., Ltd., has declared an interim dividend on the ordinary shares of 5 per cent. (same).

The Urban Electric Supply Co., Ltd., is maintaining its interim ordinary dividend at 3 per cent.

The North Metropolitan Electric Power Supply Co., Ltd., has declared an interim dividend of 4 per cent. on the ordinary shares (same).

The Oriental Telephone & Electric Co., Ltd., has declared an interim ordinary dividend of 4 per cent. tax free (same).

The Anglo-American Telegraph Co., Ltd., has announced an interim dividend for the quarter ended September 30th of ¾ per cent. on the ordinary stock and 1½ per cent. on the preferred ordinary stock, less tax.

The River Plate Electricity Co., Ltd., is paying an interim dividend of 3 per cent., less tax.

Stocks and Shares

Tuesday Evening.

THE striking success which attended the issue of the Government's £150,000,000 of Treasury 2 per cents., offered at 100, had an instantaneous effect upon prices of stocks and shares in all investment securities. British Government stocks rose substantially. Debenture stocks, such as those of the Eastern Telegraph, Eastern Extension and Western Telegraph companies put on 2 to 3 points. Anything, indeed, of a debenture or preference character came into prominence at an improved figure. The strength of investment stocks is as marked as the weakness of those speculative issues that are connected with the United States, where a wave of depression has swept over the stock market. New issues of various kinds are going remarkably well with the public. It is known that many others are almost ready to take the field, and, in view of the testimony to the abundance of money which the Treasury offer affords, it is safe to predict a spate of fresh appeals for capital in the immediate future.

The Monetary Outlook

The price of the Assented War Loan has risen well above par, and this in itself is an encouragement to the investment of funds which have been lying dormant. While the view is taken that sooner or later to-day's exceptionally low rates of money will be superseded by the return to more normal conditions, induced by recovery in trade circles, the immediate outlook suggests that money is likely to remain cheap for some considerable time to come. During this period, the prices of investment stocks and shares may reasonably be expected to appreciate, whatever may be the case in two or three years' time.

Shares on Offer

The investor of to-day is undoubtedly turning a closer attention than he has done for years past to what may be described as the gilt-edged ordinary shares in industrial undertakings. No better example of this class can be found than that which embraces the shares of the London electricity supply companies. Were proof needed, the fact of the shares standing at levels at which the return on the money to an investor is a little under 4½ per cent. would be, in itself, sufficient evidence. Moreover, the demand persists, nor is it easy to find sufficient supply with which to satisfy the prospective purchaser. Amongst the ordinary shares on offer—at the present moment—are, County of London at 49s. 3d., Metropolitans at 48s., Brompton, Chelsea and Westminsters at 32s. Notting Hill Electric Lighting ordinary shares can be bought at 39s. 3d., City of London ordinary at 42s. 6d. In all these cases, however, the amounts are comparatively modest, and as regards the County of London, City of London, and Metropolitan Companies, it would hardly be correct to base the yield on

the 7 per cent. rate of dividend which seems likely to be the standard rate for a time.

Appreciation in Prices

Amongst the rises which have occurred in the shares of the Home electricity supply companies may be mentioned those in Electric Supply Corporation, City "Lights," County of London, and South London. Urban ordinary have advanced to 32s. 6d., North Metropolitan ordinary to 53s. 3d. Amongst the overseas shares, Delhi Electric at 2⅛ are 2s. 6d. higher. Kalgoorlie Electric Power at 9s. have put on 1s. Perak River Hydro-Electrics at 2s. 3d. are a few pence harder. On the other hand, Whitehall investment 7½ per cent. preference have gone back to 16s. 3d.

Provincial Electricity

Scottish Power ordinary have strengthened to 33s. 9d., Midland Electric Power to 35s. A few hundred Bournemouth and Poole ordinary shares can be bought at 70s. 3d., and in this group, amongst shares on offer, may be mentioned 1,000 Lancashire Electric ordinary at 30s., and 1,000 Yorkshire Electric Power ordinary at 39s. 9d. The Newcastle-on-Tyne Electric Supply Company is now known as the North-Eastern Electric Supply, and 2,500 ordinary shares are available at 27s. 6d., ex dividend, giving a return of £4 7s. 6d. per cent. on the money, on the basis of the last dividends of 6 per cent. In the Suburban group, 5,000 Hendon ordinary are to be bought at 84s., giving a yield of £3 9s. per cent. free of tax, and 250 Chiswick ordinary at 40s., yielding 5⅛ per cent., taking the last-paid dividends as the basis for calculation. Amongst the Scottish shares, 1,500 Clyde Valley ordinary can be found at 31s. 3d., ex dividend, yielding £4 9s. 7d., and 1,000 Scottish at 33s. 10½d., which pay 4½ guineas per cent. On Scottish Power ordinary shares the dividends are paid once a year, in March.

It is almost essential to add, in view of the investment appetite, that part of the shares mentioned above will probably have been taken before Friday in this week.

Cables and Wireless

After their extremely breathless rises, Cables and Wireless stocks have quietened down. The 5½ per cent. preference stock is unchanged at 75½, and "A" ordinary stock is 10s. better at 28½. Bullishness fixes its hopes upon what may be the outcome of the Conference now being held at Lisbon. The stocks are amongst the few that move upon an axis of their own, being affected neither by the boomlet in gilt-edged stocks, nor by the weakness that has developed in Americans. The latter cause is responsible for a fall of 16 points in American Telephone and Telegraph stock, lowering the quotation to 147½, and International Telephones dropped to 13. Globe Telegraph and Trust ordinary are 10s. higher at 10½, and the preference 15s. up at 11½. Marconi Marines have adcanced to 31s. 3d. The United River Plate Telephone Company announces a profit for 1931 of £737,000, an improvement of £186,000, as compared with the previous year. The final dividend of 5 per cent. on the ordinary makes 8 per cent. for the year, which is the same as that in the previous twelve-months.

Dollar Stocks

Mexico Tramway 5 per cent. bonds have gone back 5 points to 35. Shawinigan Water at 18 are also 5 points down, and Power Corporation of Canada shares at 14 show a fall of 3½. Hydro-Electrics came down from 10⅜ to 8½, before recovery rallied the price to 9. Consolidated Gas & Electric of Baltimore at 87½ is 7 down, and practically everything connected with the American market is lower on the week. The shake-out in New York was started by the speech made a fortnight ago by President Hoover to the farmers of Iowa, when the recalled the near approach to departure from the gold standard that threatened the United States some months back. The mere hint at such a possibility being present gave fright to the bulls. Brazilian Tractions have eased off to 13¼; other Brazilian stocks fell under influence of the weakness in Americans and Canadians.

Tube Railway Stocks

Metropolitan consolidated advanced to 64s., showing a gain of 3 points in consequence of the boomlet in gilt-edged securities. It is argued that, with a 2 per cent. Bank Rate, the price of Metropolitan ordinary should be standing about 67. Districts strengthened to 61½, and Underground Electric ordinary shares at 18s. have recovered the slight loss sustained a week ago. The company's 6 per cent. income debenture stock at 102½ is 2 harder. Other prior charge stocks in the group reflected with improvements the effect of the remarkable success attendant upon the financing of the National Debt.

Manufacturing and Equipment

Henley's ordinary advanced to 6 1/16, and the preference shares at 5½ are the fraction harder. Few other changes of any consequence have occurred in this section. Associated Electrical Industries eased off to 18s. 9d. in sympathy with the weakness of Americans. British Aluminium ordinary drooped to 27s. In the iron and steel list, Babcock & Wilcox are 2s. lower at 42s. 6d., some uncertainty being felt as to whether the dividend may not be reduced. There is nothing doing in rubber shares.

Share List of Electrical Companies

	Nom.	Approx. Dividend. 1930.	1931.	Price, Oct. 11	Rise or Fall.	Yield p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	70/-	—	4 5 9
Brompton Ordinary	1	8½	8½	31/-	—	4 10 4
Central Electricity 4½% Deb.	Stock	4½	4½	103	—	4 7 4
Charing Cross Ordinary	1	8½	8½	32/-	—	4 7 6
Chelsea	1	8½	8½	31/6	—	4 9 0
City of London	1	10	10	42/6	+6d.	4 14 1
Clyde Valley	1	8	7	31/3	—	4 9 7
County of London	1	11	10½	48/9	+6d.	4 6 2
Edmundsons' 7% Pref.	1	7	7	29/-	—	4 16 7
Elec. Dis. Yorkshire	1	9	9	40/9	—	4 8 4
Elec. Supply Corporation	1	11	11	55/-	+⅛	4 0 0
Kensington Ordinary	1	8	8	32/6	—	4 6 2
Lancs. Light and Power	1	6½	7	28/9	—	4 17 5
London & Home Counties 4½% Deb.	Stock	4½	4½	106	—	4 4 6
London Electric	1	9	9	32/-	—	4 7 6
Metropolitan	1	10	10	47/-	—	4 5 1
Midland Counties	1	7	7	33/9	+⅛	4 3 0
Mid. Elec. Power	1	8	8	35/-	+6d.	4 11 5
North Eastern Electric Ordinary	1	6	6	27/6	+⅛	4 7 3
Do. 7% Pref.	1	7	7	30/6	—	4 11 10
Northampton	1	10	10	46/3	—	4 6 7
Notting Hill 6% Pref.	10	6	6	12½	—	4 16 0
North Met. Elec. 6% Pref.	1	6	6	28/-	—	4 5 9
St. James' and Pall Mall	1	8	8	31/-	—	4 10 4
Scottish Power	1	8	—	33/9	+6d.	4 14 10
South London	1	8½	8½	32/6	+6d.	4 6 2
Urban Ordinary	1	7	—	32/6	+3/-	4 6 2
Westminster Ordinary	1	8½	8½	31/6	—	4 9 0
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	16/3	-⅛	9 4 10
Yorkshire Elec.	1	8	8	38/9	—	4 2 6
HOME RAILS.						
Central London Ord. Assented	Stock	4	4	81½	—	4 18 2
Metropolitan	,,	3½	2½	64	+3	3 18 2
Do. District	,,	5	4½	61½	+1	7 6 4
Underground Electric	1	8	7	18/-	+6d.	7 15 7
TELEGRAPH AND TELEPHONES.						
American Tel. & Tel.	$100	9	9	147½	-16	6 2 0
Anglo-Am. Tel. Pref.	Stock	6	6	103½	—	5 16 0
Do. Def.	,,	1½	1½	26	+⅛	5 15 5
Cables & Wireless 5½% Pref.	,,	5½	2⅝	75½	—	3 12 10
Do. A 7½% Ord.	,,	—	Nil	28½	+⅛	—
Do. B ord.	,,	—	Nil	13½	—	—
Globe Tel. and T. Ord.	10	8½	Nil	10½	+½	—
Do. do. Pref.	10	6	6	11½	+⅛	5 4 4
Great Northern Tel.	10	20	20	26	—	7 13 10
Marconi-Marine	1	15	10	31/3	+6	6 8 0
Oriental Telephone Ord.	1	12	12	2⅝	—	*4 7 5
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	—	—	5/-	—	—
Do. do. 2nd Pref.	5	—	—	3/9	—	—
Do. do. 5% Deb.	Stock	—	—	7	—	—
British Electric Traction Def. Ord.	,,	5	5	300	—	—
Do. do. Pref. Ord.	,,	8	8	133½	—	5 19 10
Brazil Traction	100	—	—	13¼	-1½	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	100½	+1	4 19 6
London & Sub. Trac. 5% Pref.	1	Nil	Nil	10/-	—	—
London United Tram Deb.	Stock	4	4	62½	—	6 8 0
Mexico Trams, 5% Bonds	—	5	5	35	-5	14 5 8
Mexican Light Common	100	Nil	Nil	12½	—	—
Do. 7% Pref.	100	7	7	20	—	—
Do. 1st Bonds	—	5	5	65½	—	7 12 8
Victoria Falls Ord.	1	15	15	75/-	—	4 0 0
Yorkshire (West Riding)	1	Nil	Nil	5/-	—	—
MANUFACTURING COMPANIES.						
Assoc. Elec. Ord.	1	6	4	18/9	-9d.	4 5 4
Do. Pref.	1	8	8	30/-	—	5 6 8
Babcock & Wilcox	1	15	14	42/6	-2/0	6 11 10
British Aluminium Ord.	1	10	5	27/-	—	3 14 1
British Insulated Ord.	1	15	15	65/-	—	4 12 4
Brush Ord.	Stock	5	Nil	32	—	—
Callender's	1	15	15	3	—	5 0 0
Do. 6½% Pref.	1	6½	6½	27/6	—	4 14 6
Crompton Parkinson Ord.	5/-	30	24	22/6	—	5 6 8
Do. 8% Pref.	1	8	8	30/-	—	5 6 8
Edison-Swan 1st Pref.	1	7½	7½	23/3	—	6 9 0
Do. 5% Deb.	Stock	5	5	100	—	5 0 0
Electric Construction	1	Nil	Nil	8/9	—	—
Enfield Cable Ord.	1	25	25	4 7/8	—	5 12 8
English Electric	1	Nil	Nil	10/9	—	—
Do. do. Pref.	1	Nil	Nil	12/6	—	—
Ever Ready	5/-	35	35	27/6	—	6 7 0
Ferranti Pref.	1	7	7	24/-	—	5 16 8
G.E.C. Pref.	1	6⅞	6½	28/-	+6d.	4 12 10
Do. ord.	1	10	8	41/3	—	3 17 6
Henley's	1	30	30	6 1/16	+1/16	4 19 0
Do. 4½ Pref.	5	4½	4½	5½	+⅛	4 5 9
India-Rubber	1	Nil	Nil	3/9	—	—
Johnson & Phillips	1	10	5	1½	—	4 13 0
Siemens Ord.	1	7½	7½	24/6	—	6 2 5
Telegraph Construction	12	Nil	Nil	11	—	—

Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1931

7412. "Method for the production and control of electronic streams." J. H. O. Harries. March 10th, 1931. (380429.)

11265. "Speed control of electric motors." Standard Telephones & Cables, Ltd., and A. Braaten. April 16th, 1931. (380489.)

13480. "Means for varying the intensity of a beam of a radiation, from a steady source, so that its variations follow the characteristics of an electric current." E. G. H. Mobsby. March 5th, 1932. (380522.)

13515. "Electric plug and socket devices." Ferranti, Ltd., and A. W. Edwards. May 7th, 1931. (380437.)

14322. "Electrolytic production of white lead." H. G. Hills. May 14th, 1931. (Cognate application 28650/31.) (380457.)

14348. "Telephone systems." Automatic Electric Co., Ltd., H. S. Deyes, A. C. Corner, and C. E. Beale. May 14th, 1931. (Patent of addition not granted.) (380458.)

15997. "Electrode supports for electric discharge devices." M-O Valve Co., Ltd., C. G. Eden, and C. J. Smithells. June 1st, 1931. (380438.)

16931. "Alternating current motors." Gramophone Co., Ltd., and A. H. Johnson. June 10th, 1931. (380459.)

17029. "Control systems for electric elevators." E. W. Seeger. June 13th, 1930. (380444.)

17046. "Apparatus for covering electric dry cells." H. A. Bumke Ges. and Automspezial-Maschinen Ges. July 15th, 1930. (380475.)

17233. "Telephone systems." Siemens Bros. & Co., Ltd., and W. G. Patterson. June 13th, 1931. (380479.)

17238. "Receivers for radio-telephony and telegraphy." W. B. Mackenzie and L. S. B. Alder. June 13th, 1931. (380445.)

17254. "Means for regulating the output of prime movers of electrical generating plant." Sir W. G. Armstrong Whitworth & Co. (Engineers), Ltd., C. M. Beckett, and D. J. Watkins. June 13th, 1931. (380448.)

17260. "Separators for electrical accumulators." Chloride Electrical Storage Co., Ltd., and B. Heap. June 13th, 1931. (380465.)

17380. "Wireless direction finding systems." L. Levy. June 13th, 1930. (380466.)

17571. "Control systems for prime movers driving electrical generators." Westinghouse Electric & Manufacturing Co. June 30th, 1930. (380497.)

17599. "Electric couplers." Allen West & Co., Ltd., and W. J. Paddock. June 17th, 1931. (380498.)

17614. "Thermionic amplifiers, and control means for use in connection therewith." Marconi's Wireless Telegraph Co., Ltd., and H. J. Round. June 17th, 1931. (380499.)

17615. "Oscillographs." Marconi's Wireless Telegraph Co., Ltd., and H. J. Round. June 17th, 1931. (380500.)

17686. "Electric cables." Standard Telephones & Cables, Ltd., T. R. Scott, and T. E. D. Menzies. June 18th, 1931. (380506.)

17727. "Telephone systems." Telefonaktiebolaget L. M. Ericsson. August 4th, 1930. (380508.)

17749. "Wireless apparatus." R. F. Collinson. June 18th, 1931. (380510.)

17750. "Wireless apparatus." R. F. Collinson. June 18th, 1931. (380511.)

17809. "Electric fuses." E. M. Newman, C. D. Barklie, and Microfuses, Ltd. June 19th, 1931. (380514.)

17826. "Wire for use in establishing electrical connections in electrical apparatus, such as wireless receiving sets and the like." Hart Bros., Electrical Manufacturing Co., Ltd., and A. Hart. June 19th, 1931. (380516.)

18068. "Insulating of electrical conductors." Johnson & Phillips, Ltd., and W. H. Abbot. June 22nd, 1931. (380526.)

18089. "Automatic switches for use in telephone or like systems." Automatic Electric Co., Ltd., W. Saville, H. S. Woodhead, H. D. Sharpe, and J. McGavin. June 22nd, 1931. (380527.)

19296. "Electric junction boxes and other boxes, covers, and enclosures intended for perforation." W. T. Henley's Telegraph Works Co., Ltd., and W. H. Nichols. July 4th, 1931 (380535.)

19421. "Carrier-current electric signalling systems." General Electric Co., Ltd., F. B. Willis, and E. P. L. Westell. July 6th, 1931. (Cognate application 3352/32.) (380539.)

20641. "Apparatus for frosting the interior surfaces of incandescent lamp bulbs and other hollow glass objects." Kooperativa Förbundet. August 7th, 1930. (380547.)

21913. "Railway signalling apparatus." Siemens & General Electric Railway Signal Co., Ltd., and C. H. W. Edmonds. July 31st, 1931. (380558.)

22205. "Galvanic batteries." Oldham & Son, Ltd., and H. Holt, Jun. August 5th, 1931. (380561.)

24371. "Electric protective systems." English Electric Co., Ltd., and G. Tilstone. August 29th, 1931. (380580.)

25764. "Telegraph systems." Siemens & Halske Akt.-Ges. September 16th, 1930. (380592.)

25931. "Selective electric switch." Landis & Gyr Soc. Anon. September 20th, 1930. (380594.)

26188. "Electrical oscillation circuits." J. Rensin. R. Franek, R. Leuzendorf, and J. Weissberg. February 17th, 1931. (380597.)

26480. "Television and picture receiving systems." Telefunken Ges. für Drahtlose Telegraphie. September 26th, 1930. (380602.)

26757. "Electric stop motions for drawing frames." W. J. Scott. September 25th, 1931. (380606.)

27410. "Electric lamp bulbs for vehicle headlamps." W. C. Howard and W. H. Lund. October 2nd, 1931. (380613.)

28240. "Indicating devices for wireless tuning apparatus." A. J. Pollack and E. H. Roberts. October 12th, 1931. (380622.)

28917. "Current closing device for electric motors used to wind clocks." F. Schneider. October 17th, 1931. (380628.)

28918. "Small electric motor for clock winding and striking mechanisms, driving-gears and the like, and method of assembling the armature of same." F. Schneider. October 17th, 1931. (380629.)

29052. "High-voltage protecting arrangements for electrical circuits." Aktieselskapet Elektrisk Bureau. October 24th, 1930. (380634.)

32580. "Sound producers." Submarine Signal Co. December 13th, 1930. (380651.)

32679. "Circuit arrangements for setting the hands of clock systems." Elektrozeit Akt.-Ges. November 24th, 1930. (380652.)

33452. "Electric power switches." Siemens-Schuckertwerke Akt.-Ges. December 9th, 1930. (Addition to 19155/31.) (380657.)

33453. "Electric power switches." Siemens-Schuckertwerke Akt.-Ges. December 9th, 1930. (Addition to 19155/31.) (380658.)

33808. "Apparatus for the telegraphic transmission of graphic subjects." G. Delchef. December 5th, 1930. (380661.)

34153. "Electric condensers." Siemens-Schuckertwerke Akt.-Ges. February 12th, 1931. (380663.)

34393. "Support of electric motors in vacuum cleaners." Electrolux, Ltd. December 12th, 1930. (380665.)

35294. "Discharge tubes for the rectification of alternating current." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. January 3rd, 1931. (380672.)

35846. "Electrical insulating material composed of mica." Maschinenfabrik Oerlikon. January 8th, 1931. (380677.)

1932

522. "Oscillation generators employing thermionic valves." C. Lorenz Akt.-Ges. February 11th, 1931. (380682.)

795. "Electrically driven vehicles." International General Electric Co., Inc. January 10th, 1931. (380684.)

1192. "Electrical condensers." Elektrizitäts-Akt.-Ges. Hydrawerk. January 15th, 1931. (380686.)

1779. "Supervisory arrangements for the control of radio beacons." C. Lorenz Akt.-Ges. February 13th, 1931. (380689.)

2476. "Means for avoiding disturbances in high-frequency signalling apparatus." Ideal Werke Akt.-Ges. für Drahtlose Telephonie. February 24th, 1931. (380694.)

5145. "High-frequency systems for use in wireless signalling." Marconi's Wireless Telegraph Co., Ltd. March 21st, 1931. (380712.)

5309. "Electric oscillatory circuits for the production of constant superimposed frequencies." G. Schweikert. February 21st, 1931. (380715.)

9613. "Method of influencing an electric current by radiation." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. April 4th, 1931. (380740.)

12099. "Electron-discharge tubes or thermionic valves." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. July 27th, 1931. (380752.)

12153. "Contact-type vacuum meter, particularly for large rectifiers." Siemens-Schuckertwerke Akt.-Ges. April 27th, 1931. (380753.)

12272. "Electric flashlight devices." British Thomson-Houston Co., Ltd. April 28th, 1931. (380755.)

16660. "Dynamo-electric machines." W. Scott. June 13th, 1932. (380770.)

16700. "Driving mechanism for clocks that are wound or driven by an electric motor." F. Schneider. October 17th, 1931. (Divided application on 28920/31.) (380772.)

18352. "Protective cut-out systems." Westinghouse Electric and Manufacturing Co. June 19th, 1930. (Divided application on 17572/31.) (380520.)

18743. "Interrupters for ignition apparatus for internal-combustion engines." R. Bosch Akt.-Ges. July 20th, 1931. 380775.)

23962. "Submarine cables." Felten & Guilleaume Carlswerk Akt.-Ges. October 6th, 1931. (Addition to 295923.) (380776.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from October 5th:—

Dudlo (lettering and design). No. 531717. Class 3. High-tension coils, meter coils, and windings, and ignition coils.—British Insulated Cables, Ltd., Prescot, Lancs.

West Electric (lettering and design). No. 529753. Class 13. Hair curlers.—West Electric Hair Curler Co. (of England), Ltd., 8, Kirby Street, E.C.1.

Luxram. No. 532637. Class 13. Electric lamps (ordinary).—Vacuum Lamp Co., Ltd., 28, Duke Street, E.1.

Chugs (lettering and design). No. 532945. Class 13. Electrical devices for attachment to sparking plugs for the purpose of augmenting the voltage at the electrodes of i.c. engines.—Graham Farish, Ltd., 153, Mason's Hill, Bromley, Kent.

Kniffy. No. 533464. Class 50. Impregnated tapes for electrical insulation purposes, electrical insulating materials made principally of asbestos, paper, strawboard or cardboard coated or impregnated with synthetic or natural resins or oils, or of bitumen, mica, or condensation products of phenol and formaldehyde, or casein or similar materials, &c.—Frank Kniveton, 7b, London Road, Enfield, Middlesex.

The London Power Company's Steamers

The s.s. *John Hopkinson*, the third vessel built to the order of the London Power Company, Ltd., for the conveyance of coal direct from the North to the company's riverside generating stations, was launched on October 4th from the yard of Messrs. S. P. Austin & Son, Ltd., Sunderland. The christening ceremony was performed by Mrs. S. L. Pearce, the wife of the engineer-in-chief of the Power Company.

The fourth vessel—the s.s. *Ferranti*—will be launched from the yard of the Burntisland Shipbuilding Company on October 31st, and Mrs. Vincent Z. de Ferranti is to perform the naming ceremony. The company has recently ordered two further vessels.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdare.—Houses (52) at Hirwaun and Trecynon; U.D.C. surveyor, Town Hall.

Accrington.—Housing scheme for aged persons; borough surveyor.

Audenshaw.—New St. Hilda's Church; Rev. W. R. Jones, vicar.

Barking.—School (Dorothy Barley School) for E.C.; council's surveyor.

Barnsley.—Child welfare clinic and sewage disposal scheme. Rehousing scheme; borough surveyor.

Bedford.—Extensions to works of Igranic Electric Co., Elstow Road; Ivan Daughtry. Science block, Bedford school, for Harpur trustees; O. P. Milne.

Birmingham.—Proposed Methodist Church, Kingstanding Estate (about £12,000); Rev. A. E. Pickard, Bristol Road Methodist Church.

Blaby (LEICESTERSHIRE).—Re-erection of boot factory for George Wakeling, Ltd.

Blackburn.—Greyhound racing track for Bolton Greyhound Racing Co., Ltd.

Blakenhall (WALSALL).—Church and Sunday schools (£10,000) for the Congregational Trustees; secretary.

Brentwood.—Extensions, nurses' home, mental hospital (£9,570); Hosking & Son.

Bridlington.—Concert hall for the Entertainment Committee; T. Newton, borough architect, Town Hall.

Broadstairs and St. Peter's.—Pavilion, Garden-on-the-Sands; H. Hurd, U.D.C. surveyor.

Bromley (KENT).—R.C. schools, Plaistow Lane, for the managers; correspondent. Business stores, Widmore Road, for South Suburban Co-operative Society; Bethell & Swannell, architects, 16a, John Street, W.C.

Brownhills (STAFFS).—Houses (50) for the U.D.C.; Norman Swaine, clerk.

Bucks.—Senior school (£18,722) for the County E.C.; H. Street & Co., builders, Slough.

Burnley.—Housing scheme (60); borough surveyor.

Bury.—Alderman Smith Infants' School (about £9,000); J. Chadwick, borough engineer.

Cheriton (KENT).—Houses (23), Oaks Farm Estate, for U.D.C.; A. S. Lilley, Council Offices.

Chester.—Re-erection of Newgate House, with reconstruction of transformer sub-station, for the T.C.; F. C. Saxon, architect, Cathedral Chambers, St. Werburgh Street.

Chesterfield.—Bus station (with electrical work), £7,500; borough engineer. Houses (58) for the T.C.; G. Rowley, Brimington (39), and M. G. Gleeson, Ltd., builders, Sheffield (19).

Chippenham.—Bazaar stores, High Street, for F. W. Woolworth & Co., Ltd., London.

Crayford (KENT).—Houses (1,500), Barnehurst Park Estate, for Ideal Homesteads, Ltd.

Crewe.—Houses (73), Wistaston, for Fletcher & Sons.

Croydon.—Houses (277) and flats (16); borough surveyor.

Devizes.—Re-erection of picture palace, electrically equipped, for A. A. Pilkington (£10,000).

Durham.—Extensive alterations, 40, Silver Street, for Durham Goldsmiths Co. Housing scheme at Framwellgate for the City Council; J. W. Green, city engineer, Town Hall.

East Ham.—School, Burges Road; St. Paul's Church, trustees. Houses and flats for T.C. (£51,484); borough engineer.

Erith.—Senior school extensions (£6,226), for the E.C.; R. J. Barwick, builder, Dover.

Essex (COLCHESTER).—Staff quarters, Severells mental hospital; county architect. Junior school, Clacton-on-Sea, for the county E.C.; director of education, Chelmsford. Alterations and additions to nurses' home at Institution, Colchester and the C.C.; county architect, County Hall, Chelmsford.

Eston.—Houses (148); U.D.C. surveyor.

Fareham.—Cinema, West Street; R. A. Thomas, architect, Cosham.

Folkestone.—R.C. schools; Rev. Monsignor Coote.

Gateshead.—Alterations to High West St. Methodist Church (£5,000); secretary to the trustees.

Great Crosby.—Additional offices at Town Hall for U.D.C.; Joseph A. Wright, surveyor, Town Hall, Great Crosby.

Halifax.—Isolation hospital, Northowram Hall (electrical work); D. T. Lloyd Jones, borough engineer, Crossley Street.

Hampshire.—Three homes (50 patients each) with workshop blocks, &c., Coldeast Colony, Sarisbury Green, for the C.C.; A. L. Roberts, county architect, Winchester.

Hastings.—Mental hospital; Hastings and Eastbourne Corporations.

Hornchurch (ESSEX).—Houses (31), Mendip Road; Martin & Pearce. Houses (58), Northumberland Avenue; Maylands Estates, Ltd. Houses (72), Stafford Avenue; Newman Eyre. Houses (22), Highfield Crescent; S. Smith & Co. Houses (96), Harwood Avenue; Smith & Sharpe. Houses (31), Norman Road; G. Crabb. Houses (22), Vaughan Avenue; W. J. Standen.

Houghton-le-Spring.—Houses (100); R.D.C. surveyor, T. J. M. Morley, Council Offices.

Hull.—Schools, Pickering Road (£10,989); G. H. Panton & Sons, Ltd. Maybury Road (£11,345); A. E. Jones (Hull), Ltd. Social hall, Endyke Lane; North Hull Tenants' Association. Washhouses, Hessle Road (£9,250); city architect.

Irish Free State.—(KILLARNEY, Co. KERRY).—Houses (73); U.D.C. architect. (TIPPERARY).—Houses (37) for the U.D.C.; Michael Kirby, Town Clerk. (COOGUE, Co. MAYO).—National School; Rev. J. Grealy, Knock, Co. Mayo.

Jarrow.—Stores, housing estate; Jarrow & Hebburn Co-operative Society, Ltd. Houses (30), Old Church site; borough engineer.

Keighley.—Alterations and additions to Lawkholme Lane Municipal depôt; borough engineer, Town Hall.

Kent.—School, Aylesford, for the County E.C.; director of education, Maidstone.

Kilmarnock.—Greyhound racing track for Jno. Connelly.

Lancashire.—Schools, Little Lever, Bolton Litherland and Great Crosby, for the County E.C.; county architect, Stephen Wilkinson, 16, Ribblesdale Place, Preston. School, Grange-over-Sands; director of education, Preston.

Lanchester.—Houses (100); surveyor to R.D.C.

Liverpool.—Extension of Lourdes Hospital, Paul Street (about £5,000); mother superior, Poor Servants of Mother of God.

London.—(CHINGFORD).—Senior Roman Catholic Elementary School; Rev. J. E. Howell, Presbytery, King's Road, Chingford.

Lowestoft.—Houses (50), Kimberley Road, for J. A. Gaze & Sons.

Manchester.—Alterations to the Empress Inn, Sloane Street, Moss Side, for Walker & Homfray, Ltd.; George Westcott, architect, Game Cock Chambers, Bridge Street. Rebuilding premises of John Fenton, Ltd., Ford Lane, Pendleton; W. H. Longworth, architect, 4, St. Mary's Parsonage. Reconstruction of works of the British Recovered Rubber and Chemical Co., Ltd., Ashton New Road, Clayton; J. H. Baxter, architect, Norfolk Street, Market Place, Hyde. Erection of motor showrooms and filling station, Victoria Avenue, Rochdale Road; Sydney Moss, architect, 4, St. Anne's Square. Junior school, Wythenshawe, school (400 places), Blackley, and extensions to Burbage school; city architect.

Mansfield.—Alterations, Green Dragon Hotel, Leeming Street; Home Brewery Co. Houses (100); borough surveyor.

Middlesbrough.—Emerson Council School (£24,000); director of education. Cinema, Acklam Road; W. E. Haslock, architect, 143, Albert Road.

Newcastle-on-Tyne.—Alterations to the "Express Hotel"; J. Jackson, builders, Corporation Street. Houses (42) and shops in Pretoria; Kirk & Dickinson, builders, New Bridge. Building development at Forest Hall; Mather & Thompson, builders, Forest Hall.

Newport (ISLE OF WIGHT).—Maternity Pavilion, Parkhurst Institution (£4,000); county surveyor, Newport.

Northampton.—Hosiery factory, Grafton Street; J. Leighton, Ltd. Warehouse extension, 12-4, Wood Street; A. R. & W. Cleaver.

North Riding.—Extensions to casual wards at Poor Law Institution at Northallerton for the C.C.; R. Sawtell, surveyor, County Hall, Northallerton.

Northumberland.—Extensions, Prudhoe Hall Colony, for North-Eastern County Boroughs Joint Board for mentally defectives; Thomas Armstrong, Ltd., builders, Cockermouth.

Norwich.—Fire station, Bethel Street (£35,983); city engineer.

Oswestry.—Rebuilding Kings Theatre, New Street; H. G. Bradley & Clarke, architects, 10A, Temple Row, Birmingham; Cinema, English Walls, for J. O. & R. M. Jones, Cefn, Wrexham.

Pontefract.—Pumping station at Eggborough; F. Walter Hodson, consulting engineer, Bank Chambers, Loughborough. New dairy for the C.W.S.; Pennington, Hustler & Taylor, architects, Ropergate.

St. Albans.—Extensions, casual wards (£8,299); Humphreys, Ltd.

St. Helens.—Greyhound racing track and buildings off Pilkington Street, for St. Helens Greyhound Racing and Sports Club, Ltd. (£5,000); James, Elson, architect, 18, Queen's Street, Earlstown.

Sheffield.—Houses (184), Shiregreen Estate (£59,076); W. Malthouse, Ltd. Houses (362), Woodthorpe Estate (£118,736); R. Charlesworth, Ltd. Extensions, City General Hospital (£51,544); Corporation direct labour department. Church, Shiregreen Estate; Sheffield Methodist Council. Houses (22), Rutland Road; C. W. Alflat.

Sittingbourne & Milton Regis.—Electrically operated sewage pumps and other plant, with automatic electrical control, and other equipment, cables, wiring, &c., for the U.D.C.; A. P. I. Cotterell & Son, consulting engineers, 54, Victoria Street, Westminster, S.W.

Southend-on-Sea.—Extensions, Rochford institution; R. H. Dyer, borough engineer.

Southgate.—Shopping centre, Southgate Station; London Electric Railway Co.

Staines.—Houses (26), Bath Road, Poyle; F. R. Ingram & Co.

Stranraer.—Housing scheme (24), Sun Street; A. Maclean Goudie, architect, 30, Lochryan Street, Stranraer.

Sussex.—Senior school, Rye (£8,995), for East Sussex E.C.; Bainbeidge & Son, builders.

Swadlincote.—Houses (48) and bungalows (16), Nelson Street, for the U.D.C.; George A. Taylor, housing architect.

Swansea.—Additions, Orchard Street; Kelvin Accumulator Co., Ltd. School, New Gors (£16,250); T. E. F. Whitear, Ltd., Stockton-on-Tees. Houses (100), Mayhill Estate; L. H. Samuel, builder for Corporation. New buildings for High School for Girls (£20,000); borough architect. Houses (664), Townhill Estate; borough architect.

Torquay.—Cinema, Torwood Street; Strand Cinema Co., Ltd. Cinema, Market Street; S. G. Boultwood.

Twickenham.—Houses (118), Forty-Acre Field Estate, for B.C. (£33,533); Eadie & Co.

Walsall.—Development of Delves Estate (400 houses); Mr. Sutcliffe, builder. Schools (£25,000), Springhill Road; Jeffries and Shipley, architects, Kingscourt, Bridge Street.

Warrington.—Masonic temple, with central heating and electrical work; Albert Warburton, architect, Delph House, Appleton.

West Bromwich.—School, Friar Park; Percy C. Cox, Ltd., contractors.

Woodford.—Alterations and additions to Jubilee Hospital; governors.

Wrexham.—Houses (200), Acton Park Estate, for B.C.; Lockwood, Abercrombie & Saxons, architects, Cathedral Chambers, Chester.

York.—Estate development, Malton Road; J. W. Maw & Sons. Extensions, Foss Islands Road; Northern Motor Utilities, Ltd.